

A Database Publication

# electron

## user

Vol. 3 No. 7

April 1986 £1

# Graphics

**Combining colours:**  
learn the vital techniques

**Scrolling screens:**  
novel noticeboard utility

**Teach yourself  
micro music**

**How to recover  
lost disc files**

**TWO FULL GAMES LISTINGS**



**THE POWER  
OF OSWORD**  
Start of a great  
new series



THE BEST ARCADE ADVENTURE EVER

# Citadel

ACORN  
ELECTRON VERSION  
RELEASED 1 JANUARY 1986  
BBC MICRO VERSION  
AVAILABLE NOW

**ACORN  
ELECTRON  
BBC  
MICRO**

A huge adventure featuring over 100 beautifully detailed screens packed with challenging puzzles and awesome foes. You start in the vast 3-towered citadel with its curious cellar and well. Should you survive the perils within, you can venture on to the witch's house, Stonehenge, the pyramids, and across the desert to the mountains. Cross the ocean and you will reach the mystic temple on the island. You should devise how to use the ice crystal, trampolines, cannonballs, Egyptian statues, etc., to the best advantage in your onerous mission. Cleverly realistic animation (flickering torches, splashing water, and smouldering furnaces), is used throughout to depict your movements and to vividly portray the fearsome monks, mummies and wolves.

## COMPETITION — 2 CHANCES TO WIN!

Three crowns have been craftily hidden within the adventure; the first person to locate any two of the three crowns will win **£100**. The maximum score which can be obtained is 99 points; the first person to reach this score will be presented with an impressive personal engraved shield and a cheque for **£200**.

**KEYBOARD OR JOYSTICKS    CASSETTE VERSION \$9.95    BBC DISC VERSION \$14.95**

**WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY PROGRAMS**

**SUPERIOR SOFTWARE LTD.**



Dept. XU15, Regent House,  
Skinner Lane, Leeds 7.  
Tel: 0532 459453.



### OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post
- Postage and packing is free
- Faulty cassettes and discs will be replaced immediately





## News

All that's new in the expanding Electron world. **5**

## Invasion Force

Have you the skill to fight off wave after wave of invading Zyzaxon's as they try to penetrate Earth's defences? **9**

## Software Surgery

From Frak to Chip Buster, Football Manager to Robin of Sherwood, we update you on some of the latest software releases. **12**

## Noticeboard

Get big messages across the screen with this clever text scrolling utility. **16**

## Discs

A superb disc search routine to enable you to find and recover those lost files. **20**



## Beginners

Using GET and GETS: We examine alternative forms of keyboard input. You're bound to get the idea. **22**

## Type Castings

A lighthearted look at some of your letters asking for programming help, and a few tips to put you right. **24**

## Starword

We review the latest ROM-based word processor from Slogger **26**

## Notebook

Get to know recursion backwards. A simple program explained in a simple way. **27**



## Merlin's Cave

From Woodbury End to Hampstead our wizard continues his exploration. And there are lots more hints and tips as well. **29**

## Easter Egg Hunt

Hours of fun for the whole family with a seasonal game that also teaches the points of the compass. **33**



## Bach to Basics

If the great composer were alive today this is the program he would have used to teach music. **38**

## Osword

The first in a series of articles that will help you make full use of this powerful OS command. **44**

## Maths Workout

The logical operators AND, OR and EOR are examined as we look at the technique of bit masking, and how it can help control the outside world. **48**

## Graphics

We continue our series by investigating the difference between actual and logical colours. **51**



## Micro Messages

The pages you write yourself. A selection from the many interesting letters you've been sending us over the last few weeks. **53**

## Bargains galore!

Don't miss our special offers on Pages 57 to 60.

Managing Editor  
**Derek Meakin**  
Features Editor  
**Pete Bibby**  
Editorial Assistant  
**Roland Waddilove**  
Production Editor  
**Peter Glover**  
Art Editor

**Heather Shaldrick**  
Advertisement Manager  
**John Riding**  
Advertising Sales  
**John Snowden**  
Editor in Chief,  
Database Publications  
**Peter Bremeld**

**Published by Database Publications Ltd**  
Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

Telephone: 061-456 8835 (Editorial) 061-456 8383 (Administration) 061-456 8500 (Advertising)  
Subscriptions: 061-480 0171 Telex: Gold Mailbox 77 MAGJSD. Prestel: 614568383  
Telex: 265871 MONREF G. Quoting Ref. 79 MAGJSD

**ABC** 26.435 First June 1985

News trade distribution:  
Europress Sales and Distribution Limited,  
Unit 1, Burgess Road, Ivyhouse Lane,  
Hastings, East Sussex TN36 4NR. Tel:  
0424 430422.

Electron User is an independent publication. Accorn Computers Ltd, manufacturers of the Electron, are not responsible for any of the articles in this issue or for any of the opinions expressed.

Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

Subscription rates for 12 issues, post free:  
£12 UK & Eire (Sterling only)  
£20 Europe  
£35 Overseas

© 1986 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles or listings.

# FIRST BYTE ELECTRON JOYSTICK INTERFACE

Printer  
Interface  
**OUT NOW**  
Uses normal BBC printer commands  
No software required!

WORKS  
WITH  
MOST GAMES  
**£19.95**



## ELECTRON JOYSTICK INTERFACE

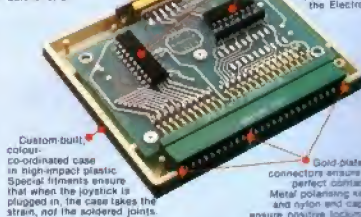
Electron users! This is the add-on everyone wants. It's the Electron switched joystick interface from First Byte - available now with free conversion tape that vastly extends your game range right away.

The interface operates with all 'Atari-style' 9 pin joysticks, and its many advanced design features put it way out in front for quality and reliability.

## Look at these advanced design features.

Works with all 'Atari-style' 9-pin joysticks and utilizes rapid-fire mode on Quickshot 2

Only 2 chips for ultra-high reliability and low power consumption ensuring safe operation with the Electron



Custom-built, colour-coordinated case in high-impact plastic. Special fittings ensure that when the joystick is plugged in, the case takes the strain, not the soldered joints.

Gold-plated connectors ensure a perfect contact. Metal polarising key and nylon end caps ensure positive locking.

AVAILABLE FROM  AND MOST COMPUTER DEALERS

## MAIL ORDER FORM

Please rush me the following items:

First Byte Joystick Interfaces at **£19.95**

First Byte Printer Interfaces at **£19.95**

TOTAL

I enclose a cheque made payable to FBC Systems Ltd.,

I wish to pay by Access Visa Expiry date

Card No.

Signed

Name

Address

Tel

**FIRST  
BYTE**

A GENUINE FIRST BYTE  
ADD-ON

First Byte Computers,  
10, Castlefields,  
Main Centre, Derby.  
DE1 2PE  
Tel: Derby (0332) 365280



# electron user NEWS

## Speech! gets good word on TV

A PROGRAM which enables Electrons to talk has been singled out for praise in front of ten million television viewers.

Speech!, from Superior Software, was described as "absolutely amazing" by Keith Chegwin, co-presenter of Saturday Superstore when it was featured on the programme recently.

And Fred Harris, best known for Micro Live, called Speech! "a knockout" during the same show.

It had earlier been demonstrated on Micro Live, where it was put through its paces delivering tongue twisters like "power mowers are thoroughly tough though".

How does it work? It's author David Hoskins explained: "This system allows the user to type in English or phoneme phrases which are then spoken by the program, for example 'SAY Hello I am a speech synthesiser'."

"The command can be typed directly to the computer or put into a program. Speech! will translate this command and reproduce it through the BBC's speaker."

The Electron version of Speech! is due out any day now and will cost £9.95 on cassette.

## ELECTRON SOFTWARE SUPPLIES BOOSTED

**ELECTRON software is going to be easier to find – and cheaper – thanks to an agreement between Acorn Computers and leading distributor Greyhound Marketing.**

Greyhound has acquired sole distribution rights to all the Electron titles produced by Acornsoft.

Up to 100 programs are involved, including

the best-seller Elite, a number of utilities including View and Viewsheets, a host of educational software and languages such as Pascal and Logo.

"This is our vote of confidence in the Electron", Bob Simpson of Greyhound told *Electron User*. "We realise there are more than 250,000 Electron owners out there who need support.

"To date the level of support from established dealers has been fairly poor. Now we hope this will change".

Greyhound has one of the largest dealer networks for Acorn software distribution in the UK, and Electron owners, particularly those who bought their machines at Christmas, have been promised a more reliable supply of programs.

Prices will become even more reasonable.

"We shall embark on a more attractive pricing policy by packaging several programs together", said Bob Simpson.

The deal initially means that the distribution company acquires about 100,000 Electron programs.

Once these are sold, decisions will be jointly taken about re-issuing titles.

"We will make these decisions as and when stock runs out", said Simpson. "Obviously, popular titles like Elite will carry on because the demand is there.

"But I have no doubt that the majority of Electron titles will be in demand for quite a while to come.

"If we didn't anticipate a continuing market for Electron software we would not have entered into this deal".

### STILL ON TOP...

**NEARLY two years after it first appeared on the market, Mini Office – the database, spreadsheet, word processing and graphics package from Database Software for the Electron – is still topping the charts.**

The latest non-games Top Five list in Acorn User magazine, compiled by Gallup, shows that Mini Office continues to lead the pack.

It beats Speech from Superior Software into second place followed by Music System from Island Logic, Typing Tutor from Pitmansoft and Firth from Acornsoft.

### Real arcade action

*ELECTRON users have a sporting chance of winning a real arcade machine worth £400. Incentive Software has included an entry form with its new release, Moon Cresta, the version of the arcade game by Nichibutsu.*

The winner will be chosen in a draw of those able to score more than 30,000 points in the game which involves rocket ships and kamikaze-style aliens. The cost: £7.95 on cassette, £9.95 on disc.



### Tipped for an award

TWO Electron games are finalists in the British Microcomputing Awards. In the Home Educational Software category MirrorSoft's Mr Men is a nominee for the award.

MirrorSoft is represented with Dynamite Dan in the Game of the Year section.



# Electron communications made easy...



Communicating with the outside world can present its own special problems for Electron users. Fortunately help is at hand, with modems and software from Pace.

Commstar is the communications software. The special Electron version has been adapted from the renowned Commstar software for the BBC micro. It provides a combination of powerful Viewdata and Terminal communications programs providing full telesoftware downloading facilities and a crisp mono display.

The Nightingale modem has become the standard by which others are judged. Combining simplicity of use with true multi-baud rate operation, Nightingale can provide access to both Viewdata (1200/75 and 75/1200 baud) and full duplex (300/300 baud) systems.



As a lower cost alternative, Pace can supply a quality acoustic modem which can be used in conjunction with Commstar to provide access to 1200/75 baud and 1200/1200 half duplex systems.

Either modem is available with Commstar and an RS232C serial interface as a complete package. Together they provide the only real solution to micro-communications for the Electron.

**Nightingale modem, Commstar and RS232C interface**  
**Acoustic modem, Commstar and RS232C interface**  
**RS232C interface alone**

**£119.00 + VAT**  
**£79.95 + VAT**  
**£58.00 + VAT**

\* A +1 interface is required for use with above



Available only from:  
**PACE Micro Technology**  
 Juniper View, Allerton Road, Bradford, West Yorkshire.  
 Tel. 0274 488211 Telex No. 51338  
 Prestel Mailbox No. 274 729306  
 Telecom Gold Mailbox No. PCE 001  
 Int. Tel. No. +44 274 488211



**The only real solution  
 for Electron communications**



# When printers spell trouble

A TELEPHONE order to a leading supplier of printers to the Electron market almost ended up in a punch-up recently. The request was for DataStar Systems to deliver 50 machines the same day to an address in the East End of London.

Not that there was anything particularly surprising in that as the company regularly delivers large orders at short notice. However when the

driver turned up at 1 Pennington Street, Wapping, he was decidedly unwelcome.

For that just happens to be the new headquarters of Rupert Murdoch's News International. And as the company is currently the centre of a dispute with all the main printing unions, it was ringed by hostile pickets.

So when the DataStar driver told them he had 50 printers in the back of his large

vehicle they were definitely not amused.

But anger turned to embarrassment when the van doors were opened to reveal that the printers were of the computer variety.

"Everyone had a good laugh about it in the end", Barry Krite of DataStar told *Electron User*, "but unfortunately the last laugh was on us - we discovered the telephone call was a hoax".

## Superior sort of secret agent

RICK Hanson, boss of Leeds-based Superior Software, has been turned into a daring secret agent by a rival company.

Robico Software at Llantrisant, Mid-Glamorgan, have chosen his name for their new Electron adventure game which has Rick trying to steal plans for a weapons system and escaping by submarine.

Robico say: "We chose the name at random, we did not know about the real Rick Hanson, honestly!"

The real Rick has had to take some stick. He said: "Normally I do not dive from submarines, not even on holiday."

"I have not seen their game but, from what I hear, my life style is not quite so exciting".

The cassette game, £9.95, Project Thesis - Rick Hanson 2, has been written with the aid of Midge, a message compression system recently released by Robico.

## Music minus moans

FROM the Land of Song comes a software audio system to remove the boredom of music practice.

Mupados at Lampeter, Dyfed, have brightened up home tutoring for all budding musicians with *Electrons*.

Their package, *Micro Maestro*, enables a soloist to follow music on the screen. This shows a bouncing ball on each note with a metronome counting out the beats.

When the piece has been mastered the player is ready for his concert debut as lead instrumentalist with full orchestral backing.

This is achieved by popping in the cassette provided into an ordinary tape recorder containing the work of professional musicians.

The arrangement has passes for the learner to come in with a solo instrumental piece.

*Micro Maestro* is a follow-up to the *Mupados Recorder Tutor* used in over 60 education authorities.

Cenlyn Evans, a director of the Welsh firm, himself a talented trumpet player, said: "Micro Maestro is a joint



The Mupados Recorder Tutor in action and (below) how the score appears on the screen

venture between ourselves and Warner Bros.

"We have our own 16 track recording studio and believe the condensed version of our Recorder Tutor will really keep up the interest of any young player who normally become bored with day-to-day practice at home.



## ELECTRON BOOST FOR THE SHOW

THE first of this year's three Electron & BBC Micro User Shows is on target to break all previous records.

And the resurgence of the Electron is playing a key role.

Within days of the announcement that the show was to return to the New Horticultural Hall, London SW1 on May 16, 17 and 18, organisers Database Publications reported unusually heavy advance bookings.

"Our people have

been surprised at just how much interest is specific to the Electron market", says Derek Meakin, head of Database.

"But this is only continuing the trend which started at our last show back in November".

It was at that time that exhibitors reported that the Electron had virtually put its big brother the BBC Micro in the shade.

"For the first time it seemed to be more

Electron-orientated than BBC", said Andrew Hildig of Slogger Software.

"The Electron is now coming out of the BBC Micro's shadow".

Since that time in excess of 90,000 new Electrons have been sold - a fact that is very much on the minds of the forthcoming show's exhibitors.

"You can be sure there will be lots of goodies around for Electron. It's a market that manufacturers ignore these days at their

peril", commented a spokesman for one major UK software house.

"The sheer volume of the machines out there now make the Electron a force with which to be reckoned".

The two other Electron & BBC Micro Shows to be held this year are scheduled for UMIST, Manchester, on September 26, 27 and 28, and at the New Horticultural Hall, once again, on November 7, 8 and 9.

# A COMBAT READY PHANTOM II WILL COST YOU £14M

"Well produced and technically good futuristic combat flight simulation featuring some of the best and smoothest 3D graphics I've come across on the Beeb." —

Computer Trade Weekly

**RATED 8 OUT OF 10 FOR QUALITY, GRAPHICS, PLAYABILITY & VALUE!**



RAF  
FLT. LT. PAUL  
COURTNAGE  
"MARVELOUS...  
'EXCELLENT'...  
FLIGHT SIMULATION...  
EVEN SEEN...  
CAPTIVATING!!"  
by Nick Brown for BBC

More than just a very fast full-flight Simulator 'Phantom Combat' offers the excitement and energy of 1500 mph air to air combat in high resolution 3D colour graphics. This 100% machine code package has been written by a military flight simulator software engineer together with the BA captain who wrote the best selling '747 simulator for Doctor Soft.

## A SIMULATOR INSIDE A SIMULATOR

In one of the training modes (Formation mode FORM) it is actually possible to fly the Phantom AND control the Enemy aircraft which can be closely seen flying in 3D outside your fully enclosed cockpit. Alternatively, a friend can pilot the enemy (or 'opposite boys') while you attack.

## THE ADVERSARY

Now, at last, enemy aircraft are NOT shown as simple 'sprites'. They are computer drawn, navigated and 'killed' at a smooth 15 frames per second. The data outlines reflect Soviet Mig 21 (fishbed) Su 15 (Flanker) performance. In combat mode (CBAT) they fight back intelligently and dangerously.

## INSIDE

Navigation is comprehensive with a wealth of clear and precise displays featuring both analogue and digital readouts, on speed in knots as shown on a dual AND digitally, with a separate Mach number display; radar computed target range altitude and bearing shown; target pointer and gunpoint; military 'Tacez' navigation (Tactical air navigation) etc.

## 'OUTSIDE'

Externals include: Horizon (other aircraft), a network of ground-based radars, separate landing runways and animated 'strobe' approach lighting. NO 'chunky' tracks, all objects are drawn in line, built-up and coloured lines. The view is recomputed and redrawn 15 times every second.

## AIR TO AIR COMBAT

Warning! There are 'no backs' but with simple turn, your action is reported and the programme rewarded if you are shot down or crash. This motivates you to try and 'bring home' a damaged aircraft. Many different forms of damage can occur. Most are survivable, on a few the runway landing is almost impossible. If you can't land, use the EJECTION seat and survive.

# THE BEST ALTERNATIVE?..

## £9.95

**PHANTOM COMBAT**  
Flight Simulator  
3rd generation flight software  
by Nick Brown and Roger Selby



**DOCTOR SOFT**  
simulations  
Doctor Soft Advanced Software

P.O. Box 66 - East Preston - Linsteadhampton  
West Sussex BN14 2TX

Telephone: (0903) 770044  
Account: (0903) 776000  
Telex: Doctor 878152 (N/C/T/C)

Available at your Local Dealer, distributed by  
Microdealer, Laisuresoft, & Centresoft. Also direct from  
Doctor Soft:



BBC

MAIL ORDER  
FIRST CLASS BY RETURN,  
POST FREE

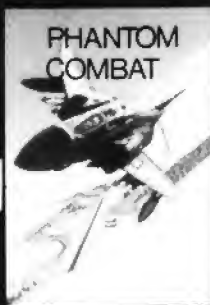


BBC DISK

\*Add £3 for disk version. Cheques/PO payable to "Doctor Soft Ltd" or state Access No. Overseas: add Airmail at cost.

Name

Address



**BBC 32K  
ELECTRON versions**





# Invasion Force

Frantic arcade action  
by **STEPHEN MARTIN**

THE evil Zyzaxon empire has developed a new super breed of high speed assault craft.

Aptly code-named the Invasion Force, their mission is to penetrate the Earth's defences. Once through, stage two of their attack wave can start.

Your job is to stop them reaching the second stage of their attack plan. You are the sole survivor of the stage one defence. Can you survive wave after wave of relentlessly advancing aliens? Play on and see...

#### Joystick users

If you have the Joyplus listing from April 1985 *Electron User* load it in and change line 1730 to:

```
1730 DATA "Invasion",255,255,255,67,255,255,98,255,1,110
```

RUN the program, select number 20 and then load in Invasion Force.

#### VARIABLES

HI% Stores high score.  
LEV% Stores the level achieved.  
L% Lives left.

#### PROCEDURES

message Prints force destroyed and wipes screen.  
assemble Assembles the machine code.  
mak Scrolls message across the screen.  
tune Plays spacey tunes.  
landed Prints force has landed and wipes screen.  
setscreen Prints level and lives and wipes screen.  
newhigh New high score?

Full listing starts  
on Page 10



# Invasion Force listing

## From Page 9

```

10 REM Invasion Force
20 REM By S.Martin
30 REM (C) Electron User
40 MODE4:ENVELOPE1,129,-
50,-6,-12,11,17,172,126,0,0,
-126,126,126:ENVELOPE2,2,1
3,-2,42,71,24,112,126,0,0,-
126,126,126:ENVELOPE3,1,1,-
2,1,5,5,12,126,0,0,-126,126,
126
50 VDU23,224,0,0,0,0,15,
127,127,31,23,225,24,24,126,
126,255,255,255,255,23,226,
0,0,0,0,240,254,254,240,23,
227,0,24,24,24,24,24,24,24,
0,23,228,16,64,28,97,8,40,
148,16,23,229,255,255,255,2,
55,255,255,255,255
60 VDU23,238,0,0,99,255,24
1,57,79,67,48,23,231,0,198,
23,147,156,242,194,12,23,2
32,96,147,15,49,25,15,17,12
,23,233,6,201,248,148,152,2
40,136,48
70 VDU23,238,0,31,57,121
,255,255,19,114,23,239,126
,255,36,36,255,153,68,0,240
,240,0,248,156,158,255,255,2
27,78,19,0,4,0,23,1,0,0,0,0
:
80 status=4900:status=
4904:status=4908:status=4
900:DIM Q:2150:HIZ=500:FOR
T=0:2STEP2:PX=0:Q=0:PTT
90, start:JSRinit:JSRres
ets, start:2:JSRcreeps:JSRpri
ntscore:mainloop
100 JSRbase:JSRbigunma:JSR
base:JSRbombs:LDAA0:CMPI
1:BNEHq1:JSRnoLand, hq1:JSR
erow:JSRcalcc:JSRrow:JSRl
anded
110 JSRbase:LDAA0:JSRRAFF
F4:JSRbigunma:JSRraissile:JSR
base:JSRbombs:LDAA0:CMPI
1:BNEHq1:JSRnoLand, hq2:JSR
erow:JSRcalcc:JSRrow
120 JSRbase:LDAA0:JSRRAFF
F4:JSRbigunma:JSRraissile:JSR
base:JSRbombs:LDAA0:CMPI
1:BNEHq1:JSRnoLand, hq3:JSR
erow:JSRcalcc:JSRrow
130 JSRbase:LDAA0:JSRRAFF

```

```

F4:JSRbigunma:JSRraissile:JSR
base:JSRbombs:LDAA0:CMPI
1:BNEHq1:JSRnoLand, hq4:JSR
erow:JSRcalcc:JSRrow
140 LDAA0:CMPI:BNEolan
d:RTS, noLand:LDAA0:CMPI
1:BNEotdead:RTS, noDead:LD
A0:CMPI:BNEquire:RTS, n
quire:JMPmainloop
150, pause:LDAA0:LDX0:JSR
RAFF4:JSRRAFF:RTS
160, init:LDAA0:1:STA070:5
TA072:STA074:STA076:LDAA0:5
TA078:STA079:STA07A:STA07B:
LDAA0:2:STA084:LDAA0:STA085:
STA08F:STA083:STA08C:STA08B
:STA08A:LDAA0:STA080:LDAA0
8:STA071:CLC:ADC02:STA073:CL
C:ADC02:STA075:CLC:ADC02:5
TA077
170 LDX0:16:LDAA0:1,1:1:STA
070,X:DEX:BPL 1:LDAA0:5:ST
A08A:LDAA0:3:STA083:RTS, base
:LDX0:8:JSRinkey:TYA:BNEpa
use:LDAA0:0:STA082:LDX0:0:JSR
inkey:TYA:BEQbaseleft:INC
0:RTS, baseleft:LDX0:9:JSRin
key:TYA
180 BEQprintbase:DEC000:
printbase:LDAA0:CMPI:BEQ
store:CMPI35:BEQstore:JMP
Pskip, restore:LDAA0:2:STA08
8:JMPfinishi, skip:LDAA0:3:JSR
RAFFEE:LDAA0:JSRRAFFEE:LDAA
27:JSRRAFFEE:LDAA0:2:JSRRAFF
EE:LDAA0:224:JSRRAFFEE:LDAA0:225:JSR
RAFFEE:LDAA0:226
190 JSRRAFFEE:LDAA0:3:JSRRAFF
EE:1, finish:RTS, inkey:LDAA
129:LDX0:235:JMPRAFF4:RTS
200, row:LDAA0:JSRRAFFEE
:LDAA0:70:JSRRAFFEE:LDAA0:71:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:230
:JSRRAFFEE:LDAA0:231:JSRRAFFEE:
JMPcd, over:LDAA0:3:JSRRAFFEE
:JSRRAFFEE:, ab:LDAA0:3:JSRRAFF
EE:INY:CPY04:BNEloop:RTS
210, row:LDAA0:3:JSRRAFFEE
:LDAA0:76:JSRRAFFEE:LDAA0:77:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:230
:JSRRAFFEE:LDAA0:231:JSRRAFFEE:
JMPcd, over:LDAA0:3:JSRRAFFEE
:JSRRAFFEE:, bci:LDAA0:3:JSRRAFF
EE:INY:CPY04:BNEloop:RTS

```

```

220, row:LDAA0:3:JSRRAFFEE
:LDAA0:74:JSRRAFFEE:LDAA0:75:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:232
:JSRRAFFEE:LDAA0:233:JSRRAFFEE:
JMPcd, over:LDAA0:3:JSRRAFFEE
:JSRRAFFEE:, cdi:LDAA0:3:JSRRAFF
EE:INY:CPY04:BNEloop:RTS
230, row:LDAA0:3:JSRRAFFEE
:LDAA0:76:JSRRAFFEE:LDAA0:77:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:232
:JSRRAFFEE:LDAA0:233:JSRRAFFEE:
JMPcd, over:LDAA0:3:JSRRAFFEE
:JSRRAFFEE:, de:LDAA0:3:JSRRAFF
EE:INY:CPY04:BNEloop:RTS
240, row:LDAA0:3:JSRRAFFEE
:LDAA0:70:JSRRAFFEE:LDAA0:71:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:32
:JSRRAFFEE:JSRRAFFEE:JMPq, ov
er:LDAA0:32:JSRRAFFEE:JSRRAFFEE
E:, q:LDAA0:3:JSRRAFFEE:INY:CPY
04:BNEloop:RTS
250, row:LDAA0:3:JSRRAFFEE
:LDAA0:72:JSRRAFFEE:LDAA0:73:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:32
:JSRRAFFEE:JSRRAFFEE:JMPq, ov
er:LDAA0:32:JSRRAFFEE:JSRRAFFEE
E:, w:LDAA0:3:JSRRAFFEE:INY:CPY
04:BNEloop:RTS
260, row:LDAA0:3:JSRRAFFEE
:LDAA0:74:JSRRAFFEE:LDAA0:75:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:32
:JSRRAFFEE:JSRRAFFEE:JMPq, ov
er:LDAA0:32:JSRRAFFEE:JSRRAFFEE
E:, r:LDAA0:3:JSRRAFFEE:INY:CPY
04:BNEloop:RTS
270, row:LDAA0:3:JSRRAFFEE
:LDAA0:76:JSRRAFFEE:LDAA0:77:JSR
RAFFEE:LDY00:, loop:LDAAstatu
s,Y:CMPI:1:BNEover:LDAA0:32
:JSRRAFFEE:JSRRAFFEE:JMPq, ov
er:LDAA0:32:JSRRAFFEE:JSRRAFFEE
E:, t:LDAA0:3:JSRRAFFEE:INY:CPY
04:BNEloop:RTS
280, cal:LDAA0:70:CMPI:1:B
NEleft:INC070:, left:CMPI02
:BNEcheck:DEC070:, check:LD
AA0:76:CMPI:20:BNEcheck2:LDAA
0:STA078:INC071:, check2:LD
AA0:76:CMPI:3:BNEnotturn:LDAA
1:STA078:INC071:, notturn:RT
S

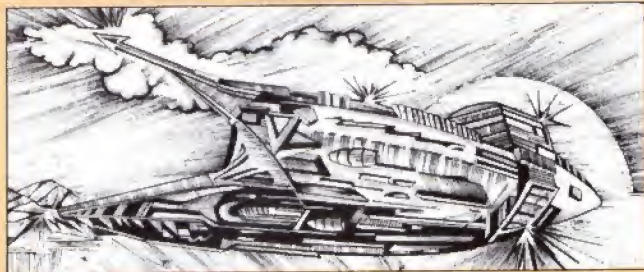
```

```

290, cal:LDAA0:79:CMPI:1:B
NEyy:INC072:, yy:CMPI:2:BNEff
:DEC072:, ff:LDAA0:72:CMPI:2:B
NE0:LDAA0:79:INC073:, o
:LDAA0:72:CMPI:3:BNE1:LDAA0:1
STA079:INC073:, 1:RTS
300, cal:LDAA0:70:CMPI:1:B
NEdd:INC074:, dd:CMPI:2:BNEk
:DEC074:, kk:LDAA0:74:CMPI:2:B
NE0:LDAA0:72:STA078:INC075:, o
:LDAA0:74:CMPI:3:BNE1:LDAA0:1
STA078:INC075:, 1:RTS
310, cal:LDAA0:70:CMPI:1:B
NEleft:INC076:, left:CMPI02
:BNEcheck:DEC076:, check:LD
AA0:76:CMPI:20:BNEcheck2:LDAA
0:STA078:INC077:, check2:LD
AA0:76:CMPI:3:BNEnotturn:LDAA
1:STA078:INC077:, notturn:RT
S
320, table:EQUB0:1:EQUB0:1
EQUB0:1:EQUB0:2:EQUB0:2:EQUB0
:EQUB0:3:EQUB0:3:EQUB0:4:EQUB
4:EQUB0:4:, m:EQUB0:4:CM
PI02:BNEofire:JMPfirering:
, nofire:LDX0:FF:JSRinkey:TY
A:BEQback:LDX0:FF:MOV 250:LD
DY0:DIV 256:LDAA0:7:JSRRAFF
F:JSRbasefire, back:RTS
330, basefire:LDAA0:0:STA0
8:3:INC083:INC083:, firering:
LDAA0:3:JSRRAFFEE:LDAA0:83:JSR
RAFFEE:LDAA0:4:JSRRAFFEE:LDAA0:32
:JSRRAFFEE:DEC084:LDAA0:4:CMPI
04:BNEnottop:LDAA0:7:STA084:
RTS, nottop:LDAA0:3:JSRRAFFEE
:LDAA0:83:JSRRAFFEE:LDAA0:84
340 JSRRAFFEE:LDAA0:135:JSR
RAFF4:TXA:CMPI:134:BEQhit:2:CM
PI:135:BEQhit:2:CMPI:135:BEQhit
1:CMPI:137:BEQhit:1:CMPI:133:
BEQyepi:LDAA0:227:JSRRAFFEE:RT
S, yepi:LDAA0:32:JSRRAFFEE:JMP
nor:, hit:2:JSRadd200:JMPpen
go, hit:1:JSRadd100:JMPpengo
350, nnn:JSRadd200:, peno
:LDAA0:4:CMPI:2:BNEof:SEC:LD
AA0:83:SEC076:Y:TYA:LDAA0:STA0
8:Y:STA08E:LDX0:BE:LDAA0:STA0
8C,X:JMPreturns, nof:LDAA0:4:
CMPI:75:BNEsecond:SEC:LDAA0:83
:SEC074:Y:TYA:LDAA0:STA0
8E
360 LDAA0:BE:LDAA0:STA0907,
X:JMPreturns, second:LDAA0:4:
CMPI:75:BNEfirst:SEC:LDAA0:83:

```





```
BDC#72:TAY:LDA table,Yi:STA#
BE:LDA#0:LDA#0:STA#903,I:J
MPrturn: first:LDA#0:CM#4
71:BN#return:SEC:LDA#0:SB#
670:TAY:LDA table,Yi:STA#6E:
LDI#BE:LDA#0:STA#0FF,X
```

```
370 .return:LDA#0:JSR#FF
EE:LDA#0:JSR#FFEE:LDA#0:J
SR#FFEE:LDA#220:JSR#FFEE:LDA
X#explo MOD 256:LDA#explo D
IV 256:LDA#0:JSR#FFFI:INCB
Si.norm:LDA#27:STA#04
```

```
323 JNPrintbase: screen:
LDA#3:JSR#FFEE:LDA#0:JSR#F
FEE:LDA#22:JSR#FFEE:LDA#0:
output1:LDA#bunker,X:JSR#FF
3:INX:CM#13:BN#output1:LDA
#3:JSR#FFEE:LDA#19:JSR#FF
EE:LDA#22:JSR#FFEE:LDA#0:ou
tput2:LDA#bunker,X:JSR#FF
INX
```

```
390 CM#13:BN#output2:LDA
#3:JSR#FFEE:LDA#3:JSR#FF
EE:LDA#22:JSR#FFEE:LDA#0:ou
tput3:LDA#bunker,X:JSR#FF
3:INX:CM#13:BN#output3:JNPr
st: bunker: EQUUS CHR#229:CHR
#229:CHR#229:CHR#10:CHR#0+C
HR#0+CHR#0+CHR#0+CHR#229+CH
R#229+CHR#229+CHR#10:CHR#0
+CHR#0+CHR#0+CHR#0+CHR#0+CH
R#229+CHR#229+CHR#32:CHR#22
9+CHR#229+CHR#13
```

```
410 .explo EQU#00002000:
EQU#00000000: fah: EQU#0000
1001: EQU#000000FF
420 .rest:LDA#0:out:LDA#0:
out:JSR#FFEE:INX:CM#13:BN
EQU:RTS: .wlat: EQU#CHR#31+C
HR#7+CHR#1+LEVEL SCORE
```

```
LIVES*CHR#31+CHR#17+C
HR#2+00000*CHR#13
```

```
430 .bomb:LDA#3:JSR#FF
EE:LDA#7C:JSR#FFEE:LDA#7D:JS
R#FFEE:INCB#7D:LDA#7D:CM#420
:BEQ#reset:LDA#32:JSR#FFEE:LDA
#3:JSR#FFEE:LDA#7C:JSR#F
FEE:LDA#7D:JSR#FFEE:LDA#135
:JSR#FFFI:TX:CM#133:BEQ#
set:CM#120:BEQ#boom:CM#129
:BEQ#boom:CM#130:BEQ#boom
440 LDA#227:JSR#FFEE:RTS:
.reset:LDA#32:JSR#FFEE:LDA#
8:STA#7C:INCB#7C:LDA#0:STA#
70:RTS: boom:LDA#3:JSR#FF
EE:LDA#00:JSR#FFEE:LDA#27:JS
R#FFEE:LDA#32:JSR#FFEE:LDA#
220:JSR#FFEE:LDA#3:JSR#FF
FEE:LDA#1:STA#0C:RTS
```

```
450 .bigunee:LDA#3:JSR#
FFEE:LDA#0:JSR#FFEE:LDA#4:
JSR#FFEE:LDA#32:JSR#FFEE:JS
R#FFEE:JSR#FFEE:LDA#00:CM#0
1:BEQ#scrag:INCB#A:JMP#pang:
scrag:DECB#A: pang:LDA#0A:C
MP#2:BEQ#frak:CM#034:BEQ#ala
gat: numma:LDA#3:JSR#FFEE:LDA
#0:JSR#FFEE:LDA#0
460 JSR#FFEE:LDA#230:JSR#
FFEE:LDA#239:JSR#FFEE:LDA#2
30:JSR#FFEE:RTS: frak:INCB#
A:LDA#0:STA#00:JNPrumma:
Jagat:DECB#A:LDA#1:STA#00:JN
Prumma
```

```
470 .printscore:LDA#3:JS
R#FFEE:LDA#17:JSR#FFEE:LDA#
2:JSR#FFEE:LDA#07:LSR#LSR#
:LSR#LSR#A:CLC:ADC#40:JSR#
FEE:LDA#07:AND#0FF:CLC:ADC#
40:JSR#FFEE:LDA#00:LSR#LSR#
A:LSR#LSR#A:CLC:ADC#40:JSR#
FFEE:LDA#00:AND#0FF:CLC:ADC
#40:JSR#FFEE:RTS
480 .add100:SED:CLC:LDA#0
```

```
0:ADC#10:STA#00:LDA#07:ADC#
0:STA#07:CLD:JMP#printscore:
.add200:SED:CLC:LDA#00:ADC#
32:STA#00:LDA#07:ADC#0:STA#
07:CLD:JMP#printscore: .lande
di:LDA#71:CM#20:BEQ#haqr:RT
Si.haqr:JSR#boom:LDA#1:STA#
04:RTS
```

```
490 RTS:JNEXT
500 CLS:PROCask("INVASION
FORCE",10,1):PRINTAB(7,10
):Z - FOR - LEFT*
:PRINTAB(7,12)*X - FO
R - RIGHT*:PRINTAB(5,
14)*SHIFT - FOR - F
IRE*:PRINTAB(7,16)*P -
FOR - PAUSE*
510 PRINTAB(11,5)*HI SCO
RE*:PRINTAB(21,5):HI#0"
:PRINTAB(7,19)*S - FO
R - SOUND*:PRINTAB(7,
21)*Q - FOR - QUI
ET*:PRINTAB(11,25)*SOUND S
TATUS=ON*:PROCask("SPACE TO
START",11,28):#FX21,0
520 #FX210,0
530 REPEAT:AS=GET#1:FA#="
Q":PRINTAB(24,25):"OFF":#
FX210,10
540 FA#="S":PRINTAB(24,
25):"ON":#FX210,0
550 UNTIL AS="":PROCtune
("98765432106677:8:899:1111
1111",3,2)
560 LEVI#0:LZ#7890=51:76
87=0:7680=0:CLS:PRINTAB(9,
2):LEVI#PRINTAB(29,2):LZ
570 REPEAT
580 CALL0Z
590 IF7684=1:7684=0:PROC1
anded:6070500
```

```
600 IF7685=16:THEM.LEVI#LEV
Z:1:PROCnewhigh:PROCnewa
ge:6070500
610 LX=LZ-1:SOUND#-10,15
,20:PROCnewscreen:FOR=1:702
000:NEXT
620 IF768C=1 AND LZ1:768
C=0:CALLstart2:6070600
630 UNTIL LX=0
640 SCZ=1000+((7687 AND &
F0)DIV 410)+100+((7687 AND &
F)+10+((7688 AND &F0) DIV 4
10)+((7688 AND &F):IF SCZ#HI
Z:PROCnewhigh
650 6070500
660 DEFPROCnewscreen:PRIN
TTAB(9,2):LEVI#PRINTAB(29,
2):LX:SCOL#0:FORLZ=0:1:200
STEP4:MOVEIX,100:DRAWIX,730
:NEXT:SCOL#,1:ENDPROC
670 DEFPROCnewaqr:PRINT
AB(10,10):"FORCE":LEVI#0
ESTROYED*FOR=1:101000:NEXT
:SCOL#,0:FORLZ=0:1:200STEP4
:MOVEIX,600:DRAWIX,700:NEXT
:SCOL#,1
680 7690=7690+1:IF7690=16
:7690=5
690 ENDPROC
700 DEFPROC1anded:SOUND#
-10,15,15:PROCnewscreen:PR
INTTAB(13,10):"FORCE HAS LAN
DED*:FOR=1:101000:NEXT:PROC
tune("677:8:899:111111111111
3,2):6COL#0:FORLZ=0:1:200
STEP4:MOVEIX,600:DRAWIX,700
:NEXT:SCOL#,1:ENDPROC
710 DEFPROCtune(S#,CX,CX)
IFORVZ=1:TOLEN(S#):NX=(ASC(M
ID#(S#,VX,1))-43)*0:SOUND#1,
CX,NZ,D1:NEXT:ENDPROC
720 DEFPROCnewhigh:HI#SC
Z:CLS:PRINTAB(12,10):"NEW
HIGH SCORE":VDUI#1,1,0:NEP
ROCtune("123456789012345678
9677:8:899:1111111111111111
3,2):FOR=1:103000:NEXT:VDUI#1,
1,7:0:ENDPROC
730 DEFPROCask(A#,XC,YC)
LOCAL XZ,YZ,XZ,ZI:ZI=XC:
YZ=YC:IZ=XZ+LENA#FOR=1:TO
LENA#XZ=XZ+1:F#MID#(A#,T,
1):FORPZ=ZI:TOXISTEP=1:PRINT
TAB(PZ,YZ):F#NEXT:NEXT:END
PROC
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

**Product:** *Astro Plumber*  
**Price:** £2.50  
**Supplier:** Blue Ribbon  
 Software, Silver House,  
 Silver Street, Doncaster.  
 Tel: 0302 21134

## Lunar cavern capers

If you are a devotee of moving through underground caverns while trying to avoid mutant monsters, then *Astro Plumber* is well worth looking at, especially as it is firmly at the budget end of the market, available on cassette for just £2.50.

The scenario is the moon,

and you play the role of the plumber who has recently arrived at Colony 11 to fix a rather leaky air supply system.

What else would you use to mend leaking pipes but a plasma laser? This does the job perfectly well but drains your oxygen supply rather dramatically. Oh, by the way, I suppose they did tell you on Earth that there are funny little sprites wandering around the system which cannot be destroyed, so must simply be avoided?

At least you'll appreciate the rather nice jetpack they gave you, so that you can fly over them, although again this drains the air supply.

Still, all is not lost because there are air tanks up on the surface which you can plug

into before dropping back underground to try to finish the job.

There are several screens – some with additional features like transport pads which move you quickly up and down the system's levels.

There are a couple of snags including the rather long time delay between being killed and the magical reincarnation. This is further aggravated by the fact that the monsters keep moving during this time, and have an annoying habit of being too close when you reappear!

Generally, though, this is a fairly enjoyable game with no original ideas, but plenty of excitement for the younger player.

**Phil Taylor**



Sound	5
Graphics	8
Playability	7
Value for money	8
Overall	7

**Product:** *Phantom Combat*  
**Price:** £9.95  
**Supplier:** Doctor Soft, PO Box 66, East Preston, Littlehampton, West Sussex BN14 2TX. Tel: 0903 770044

## Flying high

DOCTOR Soft's *Phantom* is not one of your run of the mill flight simulator programs.

The cassette carries two versions, one running in two colour Mode 4 and the other in four colour Mode 1. The former is slightly faster.

The game loads quickly, building up to comprehensive cockpit display of instruments,

unique in that some information is given in analogue form as well as digital readouts.

I found that once the short but comprehensive instructions had been read and noted, flying the aircraft was a comparatively easy task.

In the training mode the scoring is inhibited and crashes at supersonic speeds into the runway are allowed.

You can have two or one joystick operation plus keyboard. I found that one joystick plus keyboard for the other controls was the best choice.

In the Form mode, which is automatically entered above 12,000 feet, the enemy aircraft are controllable from the keyboard should you desire, and can be shot down in

combat or used to practise formation flying.

The combat mode does not allow target control, but the scoring is enabled and kills are logged. Should you get to the stage where your own aircraft is so badly damaged that it can no longer be flown the Escape key allows you to eject, preserving your score.

The aircraft flies true and is very manoeuvrable and the enemy a real threat, as I found to my cost shortly after starting.

Full marks to Doctor Soft. *Phantom* is better than I expected and well worth the money, whether you are a computer flier or an RAF pilot of the future.

**Dave Richards**



Sound	7
Graphics	8
Playability	9
Value for money	8
Overall	8

**Product:** *Secret Mission*  
**Price:** £7.95  
**Supplier:** Adventure International, 85 New Summer Street, Birmingham B19 3TE

## Toughie Adams

READERS may remember a TV program called *Mission Impossible* in which the leader of a government spy team always received his instructions on a tape, which after being played, self-destructed.

*Secret Mission* (Adventure International) is the third in the Scott Adams series of games and is based on that TV series. You, like the leader of the

spy team, have to play a tape to find out what your task is.

Your mission is to prevent the destruction of a nuclear plant. A saboteur has planted a bomb in the reactor and it is up to you to defuse it.

On playing the tape in the briefing room you discover that the saboteur has been there before you.

A quick exploration shows that you have only got access to eight locations.

Several security doors bar your way, though a visit to the grey room should give you the means of getting through one of them.

You now have a visitor's pass and a means of getting into the white room. Wait until you hear a noise though, the

saboteur is suicidal and will provide vital additions to your inventory.

The window is now the place to go and the tape recorder will help here. You'll have to fool that camera, so think who you'd send for, here, to repair the window.

You should now have another key and a return to the console should help you to get through another door. A floor cleaner is soon found and therefore, two objects that will put you well on the way to finishing the game.

I think this is the hardest of the Scott Adams games I have tried.

An excellent adventure that I highly recommend.

**Paul Gardner**



Atmosphere	5
Complexity	7
Presentation	4
Value for money	6
Overall	6



**Product:** Diamond Mine II  
**Price:** £2.50  
**Supplier:** Blue Ribbon Software, Silver House, Silver Street, Doncaster. Tel: 0302 21134

## Back to the mines

ANOTHER budget label game from Blue Ribbon, Diamond Mine II not surprisingly carries on the scenario set in their earlier game.

This is – surprise, surprise – a diamond mine, but one with more to collect, more problems to overcome and quite a

bit more "stickability factor". Actually, I wasn't over-impressed for quite some time, and only came back to load it in again because I had a review to write.

Then I found I hadn't read the instructions on the cassette inlay properly.

I had been trying to guide my vacuum cleaner pipe down through the mine, collecting diamonds, but my lives went quickly because the various monsters kept touching the pipe.

Then I read that Return would retract the pipe, and the game altered completely!

It was now a frustrating but possible assignment to collect all the diamonds from one level, on occasions having to

retract a long length of pipework as a monster appeared near the top of the screen.

Still, there was always the revenge of sucking it up in the vacuum for some bonus points.

The direction keys can be used in conjunction, so corners could be negotiated simply and swiftly, but that didn't make the game any easier to win.

Should the pipework clear a screen a harder mine soon appeared and after 10 such, the screens become invisible.

However, I will have to take Blue Ribbon's word for that as I've not got there yet.

But I'll keep playing until I do!

**Phil Tayler**



<b>Sound</b> .....	<b>6</b>
<b>Graphics</b> .....	<b>8</b>
<b>Playability</b> .....	<b>8</b>
<b>Value for money</b> .....	<b>10</b>
<b>Overall</b> .....	<b>8</b>

**Product:** Frak!  
**Price:** £7.90  
**Supplier:** Aardvark, 100 Ardleigh Green Road, Hornchurch, Essex RM11 2LG. Tel: 04024 41918

## Frak – it's sure to be another classic

AT last Frak is here and Electron owners need be envious no longer of their BBC Micro-owning friends.

Basically Frak, by Orlando, is a multi-screen ladders and levels game. However the superb graphics make it stand out from the crowd.

The main character, which you control, is a large caveman, complete with animal skin clothing, big belly and stubby chin.

The aim is to collect all the objects – diamonds, keys and light bulbs – scattered about the screen. This involves climbing ropes and ladders

and jumping from one platform to another.

The playing area is wider than the screen and when you get near the edge the screen scrolls rapidly sideways.

This is a hardware scroll and since the Electron can only scroll a minimum of 64 bytes at a time it's more like a jump than a scroll. However you get used to it after a few games.

If this were all you had to do it would be an easy game. But as you progress there are three types of monster to be disposed of, Scrubbies, Hooters and Poglets.

They don't move but nevertheless they get in your way.

Fortunately this caveman is

rather adept with a yo-yo. Don't ask me what a caveman is doing with a yo-yo, I haven't a clue. It's useful for bopping nasties, though.

As well as bashing monsters you have to dodge balloons which float up the screen and daggers which fly diagonally down. With a bit of practise these can also be yo-yoed.

As a bonus there's a screen designer which enables you to edit any of the existing screens or completely design your own starting from scratch. You can add platforms, crystals, monsters, light bulbs and so on. It can be tested at any stage so if it's not quite right you can easily alter it. The finished

screen can be saved to tape and loaded back next time.

The original BBC Frak is in Mode 1, the Electron version has been converted to Mode 4. Although it's lost a bit of colour the graphics actually seem better. The game is very slightly faster and less flickery.

Frak is one of the classics on the BBC Micro and is destined to be one of the classics on the Electron.

No games collection will be complete without it, so start saving up now.

**Roland Waddilove**

<b>Sound</b> .....	<b>9</b>
<b>Graphics</b> .....	<b>10</b>
<b>Playability</b> .....	<b>10</b>
<b>Value for money</b> .....	<b>10</b>
<b>Overall</b> .....	<b>10</b>

**Product:** Competitive Maths  
**Price:** £5.95  
**Supplier:** Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1. Tel: 01-485 3464

## Maths can be addictive

THIS is one of those programs you might tend to dismiss on first sight. However on persevering I became quite addicted to it.

The idea is to choose a mathematical subject out of addition, subtraction, multiplication and division. You are then asked for the level of

difficulty – there are three.

Now sit back and prepare yourself for the next 60 seconds of quickfire mental arithmetic questions as the computer prepares its barrage.

I found I could cope quite well with the addition and multiplication questions, but when it came to subtraction or division I had some catching up to do.

That's where the program came into its own for me. Due to its competitive nature you feel you can't stop – not yet anyway, just got to beat that last score.

After a while the questions became easier for me and I moved to level 3. The levels of

difficulty are well worked out. Each time you achieve a maximum score of 39 you move up a level.

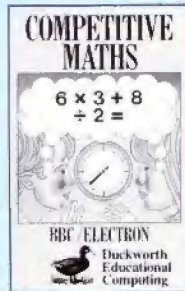
On level 3 I have as yet been unable to better my high score of 27.

One complaint I have about this program though is that in the rush to type your answer in it is often easy to hit a wrong key and this causes a point to be deducted from your score.

I suppose this helps to train your reflexes but I still found it somewhat frustrating.

This is an addictive game that is both fun and educational for children and adults alike.

**Robin Nixon**



**Product:** *Robin of Sherwood*  
**Price:** £7.95  
**Supplier:** Adventure International, 85 New Summer Street, Birmingham B19 3TE

## Superb adventure

IT isn't unusual for me to get stuck in adventures, but to do so when a cheat sheet is enclosed with the game certainly is, which goes to show the quality of Adventure International's *Robin of Sherwood*.

While the plot of the game is new, the characters and some of the events in it follow the recent TV series closely.

You, of course, play Robin of Locksley, the Hooded Man

and your task is to find and safely store the Touchstones of Rhiannon.

You start the game in the Sheriff's dungeons awaiting trial for killing deer. Escaping is difficult and probably one of the most well constructed puzzles I have seen.

Once you are free you should save the game – exploration of the castle is risky, though necessary.

It shouldn't be too long before you manage to get out of the castle and when you do you'll find yourself in the middle of a 60-odd room maze. I suggest you save the game again at this point.

The usual maze-mapping methods won't work here as the objects you have seen so far can't be collected.

The maze is logical, though,

so you can map it linearly. Moving two moves east and then two west will bring you back to your start position, providing you haven't tried to go off the map.

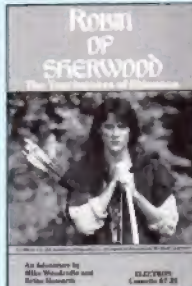
If you find you need less moves on your return journey then you have reached the edge of the map and should, by reducing the number of moves, be able to find where the edge is.

Eventually you'll manage to map it all.

I was a bit disconcerted to find myself dumped in the forest maze so suddenly, and this put me off the game for a while.

Once I had got further into it though, I found it to be one of the best adventures to have come my way for a while.

**Paul Gardner**



<b>Atmosphere</b> .....	6
<b>Complexity</b> .....	6
<b>Presentation</b> .....	5
<b>Value for money</b> .....	6
<b>Overall</b> .....	5

**Product:** *Chip Buster*  
**Price:** £7.95  
**Supplier:** Software Invasion, PO Box 68, London SW19 4TX. Tel: 01-947 8876

IF you've ever taken a peek inside your Electron you'll know that the insides are very complicated, with the tracks between the chips very hard to follow.

Software Invasion use this maze as the location for *Chip Buster*, and a very good idea it is too.

Having established this reasonable scenario they then decided to stretch our credibility a bit – the maze is infested with bugs which bite holes in the circuits.

You control a repair man

whose job it is to keep the computer running. He has none of the usual tools to help him, not even a soldering iron.

In fact all he has is a large hammer, which I'd have expected to do even more damage than the bugs, but it seems to work for him.

There are three circuit boards to choose from – Electron, standard BBC and B Plus. Contrary to real life expectations, these are apparently very prone to faults.

There's no joystick option, so keys Z, X and / are used to move around. Press Return

and the miniature electronics wizard starts hammering away to fix the holes or kill the bugs while they're chewing.

A damage report is available at any time by pressing D, and once you've figured out where each named area is you can run off to the one most in need of attention.

Should you fall in the allotted time the computer crashes and there are more bugs and invisible tracks to live up the higher levels.

*Chip Buster's* sound options allow the excruciatingly awful music to be turned off.

Animation is quite good,

scrolling by the screenful when you move to the edge of the screen, and the colours have been well chosen for maximum clarity on a colour TV, but are less clear on a monochrome one.

Although competently written, this is really a variation on the well worn arcade maze game theme. I was a bit disappointed that more wasn't made of a good idea.

However it is fast and fun enough to keep the youngsters amused for a while.

**Nick Rhodes**

<b>Sound</b> .....	2
<b>Graphics</b> .....	6
<b>Playability</b> .....	6
<b>Value for money</b> .....	5
<b>Overall</b> .....	5

**Product:** *Football Manager*  
**Price:** £8.95  
**Supplier:** Addictive Games, 10 Albert Road, Bournemouth BH1 1BZ. Tel: 0202 296404

## Top of the league

*Football Manager*, by Addictive, has to be one of the best strategy games available for home computers.

As the manager of a football club you have to get from league division four to league division one in as few seasons as possible.

The first screen asks your name and allows you to select your team from the whole league. There seems to be

little advantage in picking the well-known clubs as they are all dependent upon the skill of their manager – you.

The team you inherit is then displayed, together with six pieces of information on each player – playing position, number, skill rating, energy rating, saleable value and status (either picked or injured).

From this screen there are a number of other options affecting the game. You can get a display of your performance, beg for a loan from the bank and even pay off loans.

You can change your skill level, change the team and player names, save a game or restart a saved game.

Once you have done all the

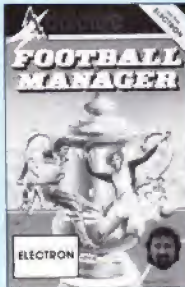
housekeeping from the first menu you have an announcement of your next fixture, which might be in either League or Cup competition.

Following this there is a readout of the comparison of the teams giving ratings for energy, morale, defence, midfield and attack. This is worth careful study as it is here that you can achieve the most valuable changes by modifying your team.

Unlike the BBC version, there is no graphical display of the actual matches, but it's none the worse for that.

I doubt that this game will ever be bettered. It is all it claims to be and is very addictive to boot.

**Dave Carlos**



<b>Sound</b> .....	5
<b>Graphics</b> .....	4
<b>Playability</b> .....	7
<b>Value for money</b> .....	7
<b>Overall</b> .....	6



**16k EPROM**  
Advanced Disc Toolkit  
containing over 30 commands

# Advanced Computer Products

Advanced Computer Products  
6 Ava House, High Street  
Chobham, Surrey, GU24 8LZ  
**(0276) 76545**

**MASTER  
COMPATIBLE**

Any Acorn user including BBC B, B+, Electron, DFS, 1770 DFS, ADFS, 2nd processor etc. OUR BEST SELLING Advanced Disc Toolkit. The ultimate toolkit, useful to all, invaluable to disc users, an absolute delight for ADFS users! Over 30 commands including - file transfer (inc LOCKED cassette files to disc, DFS to ADFS), full memory & disc editor, menu, ADFS utilities, search memory/basic, disc load & run below page, catalogue/unplug ROMS etc etc etc (supplied on 16k EPROM)

"It's excellent value for money" (Acorn User) "Take a close look at ADT-it's superb" (Database publications)

Electron & Plus 1 users: Advanced Plus 5 (A.P.5) - coming soon the ultimate interface for your Electron! Adds 11k user port (2Mbit 1MHz), bus 3+ upgrade to the tube. **16k 2 3 ROM EPROM** sockets. These will permit many quasi-control interface applications to be run. Also upgrading to the tube will allow Acorn's 2nd processor to be connected directly appearing BOTH in the memory and the speed of new configuration.

## NOW AVAILABLE

### The Advanced Plus Four (A.P.4)

- \* A FULLY ACORN COMPATIBLE disc 1 face for the ELK & Plus 1
- \* Accepts any standard 5 1/4" or 3 1/2" disc drive with PSU
- \* Supplied with 1770 DFS (as supplied on the B+ & Master series) (A.E.D. is still available for Plus 3 users - £24.15 inc.)
- \* Page stays in BEDD the same as Tape F.S. NO LOSS OF RAM
- \* Will allow more tape software to be run from disc
- \* Access compatible BBC disc-based software. No conversion program needed
- \* Extra sideways ROM socket fitted as standard (will take ADFS when avail.)
- \* A self-contained, well finished and fully tested product
- \* No 'short cuts' in design, finish or components
- \* ROM's ware includes format, verify, free space and util.
- \* Achieve greater BBC compatibility

£69.55 (VAT)

### Special Intro Packages

80 track double sided 3 1/2" OR 40T 5 1/4" DRIVE & A.P.4 £209.29  
40 80 switchable track, double sided 5 1/4" DRIVE & A.P.4 £230.93

Please phone for prices

**The Advanced Disc Investigator**  
A very powerful Disc Utility ROM for standard and non-standard discs

- \* BBC B+ Electron and Master Series
- \* Acorn 8271 DFS 0.9, DFS 1.20
- \* Acorn 1770 DFS, ADFS

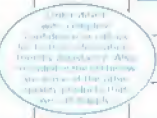
(including Acorn compatible DFS's)

Electron & Plus 1 users: Advanced ROM Adapter's & if our popular Plus 1 adapters continue to allow compatible EPROMS to be fitted in the Electron (A.R.A. II) (costs 2 sockets) also upgradable to RAM suitable for user's own routines

A.R.A. II MASTER COMPATIBLE

## Features:

- \* backup most protected discs
- \* copy 40 track discs onto 80 track disc
- \* verify two non-standard discs
- \* edit any type of non-standard disc
- \* check and repair faulty tracks
- \* create new disc formats
- \* can operate in single and double density with 1770
- \* 16k EPROM plus detailed instruction manual



Electron & Plus 3 users: gain BBC compatibility by adding the Advanced Electron DFS (1770 DFS) thus the same disc filing system supplied with the BBC B+. Now you can produce and access (compatible) BBC disc-based software. A.C.P. also supplies 5 1/4" disc drives to add to your Plus 3 (inc 2nd drive adapter). These enhance your system to both of Acorn's disc filing systems and both formats (supplied on 16k EPROM)

Electron & Plus 1 users: NEW PRICE on Advanced Sideways Ram - due to increased production and lower costs. NOW ONLY £28 (inc VAT) A.S.R. is a highly versatile but simple to use S-W-RAM cartridge that is automatically write protected on loading. Supplied with full software support including Rompage, Advanced Print Buffer & Makerom

View cartridge	(e) @ £27.95	A.D.T. (16k EPROM)	(be) @ £34.50
V/Sheet cart	(e) @ £27.95	A.R.A. I (cart.)	(e) @ £10.35
Lisp cartridge	(e) @ £21.95	A.R.A. II (cart.)	(e) @ £14.95
Logo cartridge	(e) @ £54.95	A.S.R.	(e) @ £29.90
ISO Pascal cart.	(e) @ £54.90	A.E.D. (16k EPROM)	(e) @ £24.15
E Adv.Usr Guide	(e) @ £9.95	A.D.I. (16k EPROM)	(be) @ £28.75
+ 2nd.driv.adp.	(e) @ £7.95	A.P.4	(e) @ £79.98
5 1/4" drive from	(e) @ £159.95		
3 1/2" drive from	(e) @ £135.95		
3 1/2" discs (10)	(e) @ £29.00		

## Special Offers

16k EPROMS	(be) @ £4.25
16k EPROMS (4+)	(be) @ £3.75
8k Static RAM	(be) @ £4.50

(Product codes ... b=BBC, e=Electron)

I enclose payment for ... £

My Name \_\_\_\_\_ **Advanced Computer Products**  
Address \_\_\_\_\_ 6 Ava House, High Street, Chobham, Surrey, GU24 8LZ  
0276 76545

REF EQ

Tel \_\_\_\_\_





## Scroll your chosen message along the bottom of your screen with this routine by STEPHEN MARTIN

**NOTICE Board** is a useful program which allows a message of your choice to be scrolled along the bottom of the screen.

The length of the message can be varied along with the speed of the scrolling and the background and foreground colours used.

The routine is in machine code with a small Basic procedure to let you pass the variables used.

The code is held in the procedure *assemble* and this should be tagged on to the end of your program. The other procedure *text*, which "prints" the message, should follow it.

To scroll a particular message across the screen you must call the procedure *text*. The syntax of this is:

```
PROCtext("message",foreground,background,speed)
```

The string "message" refers of course to the text which you wish to scroll. *foreground* and *background* refer to the colours in the scrolling window, and *speed* is the rate at which scrolling occurs.

The value of *speed* should be set to a integer greater than zero. One is the normal value,

and the greater the number the slower the speed.

Although *foreground* and *background* refer to the colours the values are not the normal ones used in the COLOUR command.

The reason for this is that the program pokes the letters on to the screen instead of printing them. This is a lot faster than using the operating system's printing routines.

The values of *foreground* and *background* could be any number from 0 to 255, but most of the values would produce unreadable multi-coloured effects.

If you look at Figure 1 you will see the numbers which correspond to the colours in Mode 5.

Use of other values than these is only advisable if the foreground or background takes one of the values in the table.

For example, set the back-

Colours	hex	decimal
Black	&00	0
Red	&0F	15
Yellow	&F0	240
White	&FF	255

Figure 1: Colour Codes

ground colour to red and the foreground colour to any other value between 0 and 255.

If you wish to scroll a message which is exceptionally long and will not fit into one call to PROCtext because of the restriction in length on a Basic line, you can quite easily split it into two or more calls like this:

```
10 PROCtext("A really long message...",&FF,&F0,1)
20 PROCtext("...the rest of the really long message.",&FF,&F0)
```

Here's how the routine works: The machine code is in two parts. The first is the section which scrolls the window at the bottom of the screen.

The process is quite straightforward once you have studied the screen memory map. Look at Figure 11 and you will see that the screen is made up of a number of rows and columns, 40 columns by 32 rows to be exact. The Mode 5 screen does in fact have only 20 characters not 40, but each character is made up of two bytes making two columns for each character so  $2 \times 20 = 40$ .

To make a row of the screen scroll left it is just a matter of swapping bytes of the screen memory.

The first byte is loaded with the contents of the second byte, then the second byte is loaded with the contents of the third byte, and so on.

Lines 220 and 390 are the

# Notice Board

heart of the scrolling routine.

The second and most complicated part of the program is devoted to actually placing each row of the character on the screen.

The whole definition of the current character is discovered by calling OSWORD with A=&0A. Now for simplicity let us imagine we only wish to place the top row of the character on the screen.

Figure III represents this top row with a shaded-in block representing a 1 in binary notation.

We have to work our way along the columns 8 to 1 and each time detect if there is a block there or not.

If there is we have to place one on the screen, scroll it, then cycle back for another check. Of course in the program we are checking all eight rows and eight columns.

A slight complication arises when you realise that the computer gives us the character definition in a series of decimal numbers, not binary digits.

Of course we could convert the numbers into binary, but there is a much quicker and more elegant way of discovering whether we need to plot a block or not.

The solution is to use the logical operator AND.

The rules of AND are explained in Figure IV. It's fairly simple. AND requires two inputs, the output from an AND gate only being one if the two inputs are 1.

If we want to discover

&5800	&5808	&5810
&5801	&5809	&5811
&5802	&580A	&5812
&5803	&580B	&5813
&5804	&580C	&5814
&5805	&580D	&5815
&5806	&580E	&5816
&5807	&580F	&5817
&5940	&5948	&5950
&5941	&5949	&5951

Figure II: How the Mode 5 screen is built up

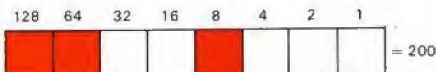


Figure III: A typical character row

INPUT 1	INPUT 2	OUTPUT
0	0	0
1	0	0
0	1	0
1	1	1

Figure IV: How AND combines inputs

whether there is a 1 in the leftmost column of our character row in Figure III, we AND the row value with 128.

11001000 = 200
AND 10000000 = 128
10000000 = Result

The result is now compared

with the value you ANDed, in this case 128. If the two digits are equal then there is a 1 in the character definition.

This process is carried out for every row and column in the definition.

And that's all there is to it. All that remains is for you to incorporate it in your own programs.

# ard...Notic

From Page 17

```

10 REM Notice Board
20 REM BY S.Martin
30 REM (C) Electron User
40 *KEY10 OLDIN
50 ON ERROR GOTO 80
60 #F1&7,120,1
70 %2121&06:7%213&4F1:7
42AC=0
80 ON ERROR OFF
90 MODES:VDU23,1,0;0;0
;
100 VDU23,255,66,60,90,25
5,129,255,126,219
110 PROCAssemble
120 PROCText("Notice Board",%FF,%FF,1)
130 PROCText("Electron ",210,170,21)
140 PROCText("User ",%FF,%FF,3)
150 PROCText(STRING$(5,CHR$(255+" ")),%FF,129,1)
160 PRINT "Press Break!"
170 END
    
```

```

180 DEFPROCAssemble
190 osbyte:=!A20A AND &FFF
F
200 DIM OZ 1050
210 FOR=0 TO 2STEP2
220 P1=OZ
230 CDPIT
240 .scroll
250 LDA#0E0:STA#70
260 LDA#074:STA#71:STA#73
270 LDA#0E0:STA#72
280 JSRdelay
290 LDH#7
300 LDV#0
310 SEI:LDA #4:frame BIT
%FER0:BEQ frame %FX19
320 .loop
330 LDA(%72),Y:STA(%70),Y
340 INY
350 BNEloop
360 LDA#070:CLC
370 ADC#040:STA#70
380 BCCa1
390 INC#71
400 .a1
410 INC#71
    
```

```

420 LDA#070:CLC
430 ADC#0:STA#72
440 LDA#71:ADC#0
450 STA#73
460 DEI
470 BPLloop
480 CLI:RTS
490 .letters
500 LDA #return MOD256:ST
A #22B:LDA #return DIV256:5
TA #229
510 LDH#0
520 .get
530 LDAMessage,X
540 CNP#13
550 BNEnotlast
560 CLI:RTS
570 .notlast
580 STX#76
590 STAMsubject
600 LDH#subject MOD 256
610 LDV#subject DIV 256
620 LDA#0A:JSR#FFF1
630 SEI
640 LDH#76
650 LDA#12B:STAMask
    
```

QUAL-SOFT

# THOUGHTWARE

Sports simulations

*"A real challenge to the thinking football fan... Bobby Robson could do worse than have a crack at this in his preparation for the World Cup".*

AMSTRAD ACTION  
REVIEW Jan '86

QUAL-SOFT COMMENT: At last an INTELLIGENT management game for the knowledgeable soccer enthusiast!

TAPE 1  
QUALIFIERS

## MEXICO '86\*

TAPE 2  
FINALS

A WORLD CUP MANAGEMENT SIMULATION

Summer 1984 and English International football is at its lowest ebb. We have failed to qualify for the European Nations Cup, and had a string of very poor international results. In a few months we will set out on the '86 World Cup qualifying trail. You have been given the most important job of restoring English pride in their football. You have a match in Paris, the USSR at Wembley, and a South American tour, to assemble a team, first to qualify, and then to beat the world's best in Mexico.

TAPE 1 (Qualifiers)

- \* Current squad of 16 players + 20 user defined players.
- \* Friendlies in Paris, at Wembley + South American tour.
- \* ANY team formation you choose. 2 from 5 substitutes.
- \* In match tactics: any no. of individual player adjustments.
- \* Your qualification group: full results and table.

TAPE 2 (Finals)

- \* Choose a 20 man squad to take to the finals.
- \* Group of 4 prelims. 16 to final knockout comp.
- \* Extra Time, PENALTY SHOOT-OUTS, where relevant.
- \* Formation and strength information on opposition.
- \* 2 from 9 substitutes (the FA tells us so).

ENGLAND'S GAMES: FULL PITCH, 22 MAN, 3D GRAPHICS & SOUND EFFECTS

QUAL-SOFT comments: With 5 levels of play, 12 depths of sophistication, and "fun" graphics, this game can be enjoyed by an 8 year old youngster as a "fun" game, and by the most sophisticated as a tactical/strategy challenge of the highest order.

PACKAGE: Tape 1 plus Tape 2 plus 20 Page Manual in "Video Cassette" style pack. Only £9.95 (\$7K RAM usage. Some would call this a MEGAGAME. YES IT WILL RUN ON YOUR 32K ELECTRON

QUALSOFT GUARANTEE: Sent by 1ST CLASS POST on day of the order with P.O., Cheque, Access payment is received. Telephone Access orders accepted.

\* The use of the name MEXICO '86 does not imply any association with FIFA

QUAL-SOFT,  
Dept. EU  
18 Hazelmere Rd.,  
Stevenage, Herts SG2 8RX.

Tel: 0438  
721936

Please supply:  
MEXICO '86  
Electron ☐  
BBC 'B' ☐

Name: .....  
Address: .....  
Access No. (if applicable) .....



```

660 .innerloop
670 LDA#0:STA#0
680 LDA#75:STA#1
690 LDY#0

700 .outputrow
710 LDAinfo,Y:ANDmask
720 CMPmask
730 BNEspace
740 JSRpoke
750 JMPdoneone
760 .poke
770 STY#77

780 LDY#7
790 LDA#02
800 .poloop
810 STA#100,Y
820 DEY
830 BPLpoloop
840 LDY#77
850 RTS
860 .space
870 STY#77
880 LDY#7
890 LDA#83
900 .spiloop

```

```

910 STA#00,Y
920 DEY
930 BPLspiloop
940 LDY#77
950 .doneone
960 LDA#00
970 CLC:ADC#40
980 STA#00
990 LDA#81:ADC#401
1000 STA#01
1010 INY
1020 CPY#8
1030 BNEoutputrow
1040 STX#79
1050 JSRdelay
1060 JSRscroll
1070 LDY#79
1080 LDA#mask
1090 LSRA:STAmask
1100 BNEinnerloop
1110 INX
1120 JMPget
1130 .delay
1140 LDY#78
1150 .dloop
1160 SEI:LDA #4:.frame BIT

```

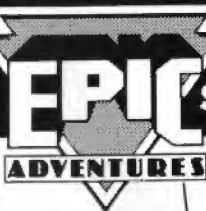
```

&FE00:BED frame \&FX19
1170 CLI:DEY
1180 BNEdloop
1190 .return RTS
1200 .subject
1210 NOP
1220 .info
1230 NOP:NOP
1240 NOP:NOP
1250 NOP:NOP
1260 NOP:NOP
1270 NOP
1280 .mask
1290 NOP
1300 .message
1310 RTS
1320 : NEXT:ENDPROC
1330 DEFPROCtext ($,fX,bX,
dX):IFdX<1:ENDPROC ELSE ?&f
&dX:=&02+fX:&03=bX:&mess
age=&f:CALLletters:ENDPROC

```

*This listing is included in  
this month's cassette  
tape offer. See order  
form on Page 61.*

EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES



# No true adventurer should be without them

Electron User October 1985.

## All Epic Adventures contain the following features:

- Written in machine code to give fast response
- At least 220 fully described locations
- Commands can be entered as full sentences
- Fast game-save on tape
- Large vocabulary
- Lots of objects, treasures and puzzles to solve

The Wheel of Fortune has many additional features including an advanced command interpreter which accepts multi-statement sentences and also allows you to talk to the intelligent characters in the game.

## The Wheel of Fortune

VOTED THE TOP ADVENTURE BY ELECTRON USER READERS

You are transported to a fantasy world of magic and mystery. As you wander this mystical land you encounter some strange people. They may help you to find valuable treasures but don't upset them or you may not live to find the Wheel of Fortune and return to civilisation.

**THE QUEST FOR THE HOLY GRAIL:** To become a Knight of the Round Table, you must find the Holy Grail and return it to Camelot. Sounds simple, but you will have to face the deadly Black Knight, befriend the beautiful maidens, summon the mystical monks and solve a host of other problems to complete your quest.

**CASTLE FRANKENSTEIN:** The Frankenstein monster is terrorising the villagers. You have been elected to seek out and destroy him, but where do you start? Perhaps the graveyard holds some clues, or the deserted shack? Once you enter Frankenstein's castle, your adventure has only just begun.

**THE KINGDOM OF KLEIN:** The Wicked Witch of the Mountain has stolen the magic Klein Bottle from the palace. She has sworn to put a hideous curse on whoever tries to recover it. Can you discover the mystical properties of the Bottle and destroy the witch? Can you then escape from her domain alive?

## ORDER FORM

	PRICE	Qty	Help Sheet Tick Box
The Wheel of Fortune	£8.95		
Castle Frankenstein	£6.95		
The Quest for the Holy Grail	£6.95		
The Kingdom of Klein	£6.95		

Please add 50p for Postage & Packing

I ENCLOSE CHEQUE/PO, TO THE VALUE OF

To: Epic Software, 10 Gladstone St.,  
Kibworth Beauchamp, Leicester LE8 0HL

NAME

ADDRESS

AVAILABLE ON CASSETTE  
FOR THE ACORN ELECTRON

(Payable to 'Epic Software')

ALL ORDERS DESPATCHED  
WITHIN 24 HOURS

Send letter if you  
don't want to  
cut magazine.

EPIC ADVENTURES - TOP QUALITY ADVENTURES FOR THE ACORN ELECTRON

IN the last two articles we've used Oswald &72 to access the 1770 Floppy Disc Controller (FDC) directly. This enabled us to write a fast backup utility and sector editor.

Now we'll use Oswald &72 to recover lost files and write a disc search utility.

It's quite easy to delete a file on disc accidentally – every disc user has done it at one time or another.

It can happen when using commands that use wild cards, for instance:

## \*DESTROY Prog\*

would destroy all programs beginning with the letters Prog.

When backing up discs have you ever muddled up the source and destination discs?

Or taken a disc out before the red light has gone off and written the directory of one disc to the next disc you put in?

That is fatal – you lose everything. But don't despair, everything is not lost. The files can be recovered.

Unlike tape, when a file on a disc is deleted it is not erased or wiped from the disc, it's still there. You can confirm this by saving a file to disc and then \*DESTROYing it.

Use the sector editor from last time to examine the disc. Typing in:

## \*INFO progname

before deleting the file will tell you the disc address where the program is stored – it's the last number printed.

You'll see that it's still there although \*CAT will tell you otherwise, and if you try to load it you'll get the "Not found" message.

As you know, a directory contains a list of files on the disc. When a file is \*DELETED or \*DESTROYed it is simply removed from the list. If it's not on the list in the directory then the ADFS thinks that it's not on the disc.

But, as we've seen, it is still there, so how can we recover it? The answer is to use

Oswald &72 to load directly from the disc the sectors in which the program is stored.

We need to know at which sector the file starts and how many sectors it covers.



The sector editor could be used for this, but trying to find a 1k program on a disc with 320k of storage space would be like trying to find the proverbial needle in a

haystack. You can do it, but it would take a long time.

What we need is a utility to search the disc for the file.

Take a look at Program I, Disc Search, which searches

since we aren't defining any characters.

A search for the string is then carried out by PROCsearch. The sector currently being looked at is printed, and if there's a match the disc address is printed.

What string should you search for? I always put the title of a Basic program in a REM statement at the start, usually in line 10.

In order to find where Program I is on my disc I would search for the string "Disc Search" or maybe even "R.A. Waddilove".

Note, however, that Basic keywords such as REM are stored as tokens, not ASCII characters, so don't include REM itself in the search string.

You may have noticed when examining discs using the sector editor that pro-

the contents of the disc for an ASCII string.

Oswald &72 is used by PROCsector to load each sector one by one into RAM. &COO is a convenient place

```

10 REM Disc Search
20 REM BY R.A.Waddilove
30 REM (c) Electron User
40 MOUNT 6
50 #MOUNT
60 #FI16
70 FDC=4900
80 INPUT LINE"String ";
a$
90 $I=ASC(a$)
100 FOR IZ=0 TO 4FF
110 PRINT "k";I;"I";CHR$(I);
120 PROCsector
130 PROCsearch
140 NEXT
150 PRINT "Finished!"

160 END
170
180 DEF PROCsector
190 ?FDC=0
200 FDC:=I+&COO
210 FDC75=600
220 FDC76:=IZ DIV 10000:FD
C77:=(IZ DIV 100)AND &FF:FD
C78:=IZ AND &FF
230 FDC79=1
240 AZ=k72:I=FDC DIV 256
:IZ=FDC MOD 256:CALL &FF1
250 IF ?FDC=0 PRINT "Disc
Error at k";I;"I"
260 ENDPROC
270

280 DEF PROCsearch
290 FOR AZ=kCOO TO kDOO-L
EN(a$)
300 IF ?AZ=&I PROCtest
310 NEXT
320 ENDPROC
330
340 DEF PROCtest
350 match=TRUE
360 FOR CI=0 TO LEN(a$)-1
370 IF AZ7CI(>ASC(MID$a$
,CI+1)) match=FALSE
380 NEXT
390 IF match PRINT "k";I;"
I";a$
400 ENDPROC
    
```

Program I



grams are always stored starting at the beginning of a sector. They never start half way through.

Since the title in Program I is at the start of the program, in the first 30 or 40 bytes, we could restrict the search. Line 209 should be altered to:

290 FOR AX=4C00 TO 4C20

This would make it much faster.

Having found the address of our lost file Program II, Recover, loads it into RAM. Osword & 72 is used as before.

Line 100 sets the load address to &2000 and line 130 tells the 1770 FDC to load 64 sectors (64 sectors is 16k, which should be enough for most programs).

If it's a Basic program, after loading set HIMEM to &6000.

```

10 REM Recover
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE 6:HIMEM=&2000
50 *MOUNT
60 FDC=&900
70 INPUT "Disc address=k
*as
80 AX=EVAL("k"+as)MOD&50
120 ?FDC=0
130 FDC1=&2000
140 FDC75=&400
150 FDC76=AX DIV &10000:FDC
C77=(AX DIV &100)AND &FFF:FDC
C78=AX AND &FF
160 FDC79=64
170 AX=&72:Y1=FDC DIV 256
:XX=FDC MOD 256:CALL WFFF:

```

Program II

PAGE to &2000 and type OLD. If you're lucky the program will be intact and can be saved to another disc.

If you're not so lucky the program will be corrupted and you'll get "Bad program". If this happens enter:

!TOP=&FFF0

This is a "Bad program" fix, and recovers as much of the program as possible.

The same technique can be used for machine code, data or spooled files and not just Basic programs.

With a machine code program there might not be a suitable Ascii string to search

for. I'll leave it to you to modify the input to accept a series of hex numbers instead of a string.

Alternatively, if you wanted to search for the sequence &AB, &CD, &EF you could simply change line 80 in Program I to:

80as=CHR\$(LAB)+CHR\$(ACD)+CHR\$(AEF)

After recovering the file you'll need to \*SAVE it to another disc.

Remember that these are powerful tools, so experiment with a disc which has nothing valuable on until you are sure the programs are working correctly.

There's no need to despair when you lose a file now. With a bit of luck, and these two utilities, you can recover it.

## JOYSTICKS— THE COMPLETE SOLUTION



### DELTA 3B SINGLE—BBC B or ELECTRON PLUS 1 £12.00

A single joystick that in some ways can act as two. The custom made special "low noise" potentiometers are wired so that it will work as a left hand or right hand joystick. It can even run some programs written for two joysticks and has the fire buttons of both.

### DELTA 3B TWIN—BBC B or ELECTRON PLUS 1 £19.95

A direct but improved alternative for the original ACORN joysticks, with 2 joysticks wired to one plug. As with all our joysticks they have the fast action sprung to centre return of the steel shafted nylon covered joystick. The light action makes them ideal to hold and the 3 fire buttons allow left or right-handed use.



Available from your dealer  
or direct from us



# Voltmace Limited

Park Drive  
Baldock  
Herts  
SG7 6EW  
Telephone (0462) 894410

AT this stage in our course on Basic Program I should give you no problems.

As you can see the program asks you to give it a letter from the keyboard (line 20) and the next line stores it in the string variable `letter$`. Line 40 just tells you what you entered, in case you'd forgotten.

It's a fairly trivial program but it does have some interesting points.

Note that although we say it accepts a letter from the keyboard in fact you have to give it a letter and then press Return before the program will accept it.

This is because when you press a key the letter on that key, or rather its code enters a special bit of memory known as the keyboard buffer.

You can look on this as a sort of notepad that keeps track of what you've typed in. The Electron doesn't take notice of what's in the buffer until Return is pressed. Hence

```
10 REM Program I
20 PRINT "Give me a
letter"
30 INPUT letter$
40 PRINT "You gave me
the letter ";letter$
```

Program I

# Reaching the point of no Return

you always have to finish a line by pressing Return.

With Program I it's quite possible that there might be more than one letter in the buffer when you press Return. So which letter did you mean?

In this case it doesn't matter, `letter$` will quite happily hold more than one character.

However, if you were using it in a more complicated program you might be testing `letter$` to decide on a course of action and if your program assumes that it only has one letter when in fact it may have

more, you've got problems.

So using INPUT to read a single letter off the keyboard has its drawbacks. You have to press Return and you may get more letters than you bargain for. Also the program stops dead until you give it something to satisfy the input.

Program II uses the function GET\$ to solve some of these problems. GET\$ looks at the keyboard buffer, takes the first character it finds there and stores it in a string variable for later use.

There's no need to press Return to alert the micro to the

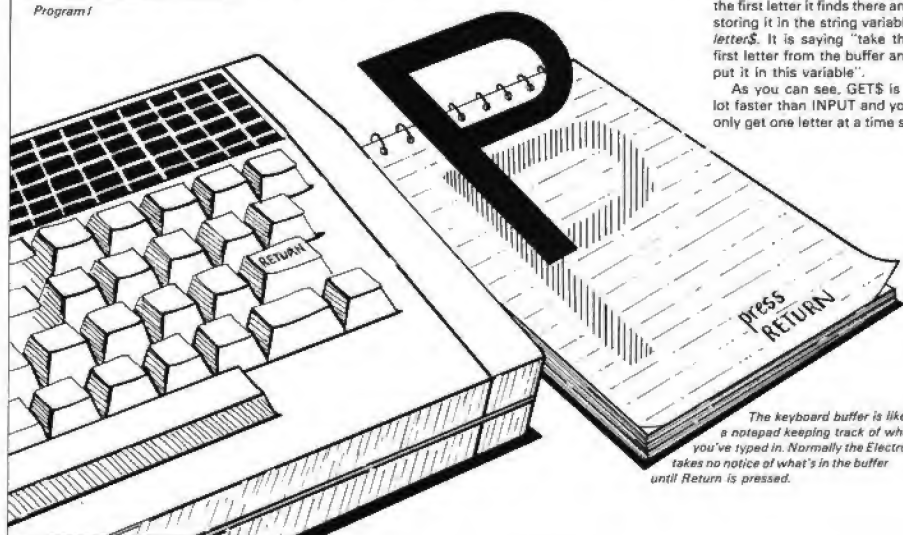
fact that you've typed something in. With GET\$ all you have to do is press the key. You've reached the point of no Return.

```
10 REM Program II
20 PRINT "Give me a
letter"
30 letter$=GET$
40 PRINT "You gave me
the letter ";letter$
```

Program II

Line 30 is the important one. This has the Electron looking at the buffer, taking the first letter it finds there and storing it in the string variable `letter$`. It is saying "take the first letter from the buffer and put it in this variable".

As you can see, GET\$ is a lot faster than INPUT and you only get one letter at a time so



The keyboard buffer is like a notepad keeping track of what you've typed in. Normally the Electron takes no notice of what's in the buffer until Return is pressed.



It's great for collecting the answers to lines like:

```
PRINT "Want another go?
Y/N"
```

GET\$ has a related function, GET. This works in the same way, looking at the first letter in the keyboard buffer and storing it in a variable. However instead of storing the letter itself into a string variable GET stores the Ascii code of the letter in a numeric variable. Program III shows it in action.

```
10 REM Program III
20 PRINT "Give me a
letter"
30 letter=GET
40 PRINT "You gave me
the letter ";CHR$(letter)
```

Program III

It's much the same as the previous program except that *letter* is now used to hold the information dragged from the keyboard buffer.

Notice how we have to use the CHR\$ function to translate from the Ascii in line 40. Otherwise we'd just have a fairly meaningless number.

At first GET seems to be less useful than GET\$ as you nearly always want a letter from the keyboard rather than its Ascii number. However it does have its uses, as you'll see when you run Program IV.

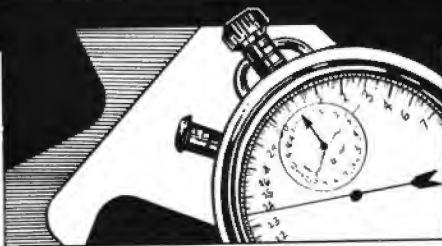
```
10 REM Program IV
20 PRINT "Give me a
letter"
30 letter=GET
40 IF letter%6 THEN
letter=letter-32
50 PRINT "You gave me
the letter ";CHR$(letter)
```

Program IV

The aim of this program is to take a letter from the keyboard and display it in uppercase. In other words, if you enter the program changes it to E before displaying it.

Once you know that the Ascii code of a lowercase letter is 32 more than that of the corresponding uppercase letter then line 40 should hold no fears for you.

One of the problems with both GET and GET\$ is that it



takes the first letter from the keyboard buffer and sometimes this isn't the one you want. Often it contains left over letters from a previous part of the program.

You've probably come across this in a poorly written game where you've been frantically pounding the X and Z keys to move your laser. Your last life is lost and you're asked:

"Want another go? Y/N"

but before you can answer the game's over and a lot of Zs and Xs appear next to the prompt.

of GET is to halt a program until the user presses a key to say he's ready for the next bit. The lines:

```
*FX21,0
PRINT "Press a key when
ready"
wait=GET
```

will stop the program until a key is pressed. As wait isn't needed, it doesn't matter what key is pressed. Here GET is just used as a brake while wait is a dummy.

Useful as GET\$ and GET

## PETE BIBBY examines the way the keyboard buffer can be manipulated

The keyboard buffer strikes again. It was full of unused Xs and Zs so your Y or N never got to the front of the queue.

The moral is that if you're going to look at the keyboard buffer make sure the letter you want is at the front. You do this by flushing the buffer with the operating system command:

```
*FX21,0
```

This gets rid of everything in the buffer, so if you use it just before a GET or GET\$ then you know you'll get the correct letter. In the case of the last two programs:

```
25 *FX21,0
```

does the trick. So the rule is flush your buffer before you use GET or GET\$.

While using GET and GET\$ solves the problem of getting a letter from a keyboard without having to press Return they still cause the program to halt, if you don't give it anything it just waits expectantly.

In fact one of the main uses

are, they have their limitations. Sometimes you just want a program to take a peek at the keyboard and if there's nothing doing to get on with the job rather than hang around.

One example of this is a loop which you want to go on looping until the user presses N. Obviously you don't want it to grind to a halt everytime it gets to a line like:

```
IF GET$="N" THEN ...
```

The answer lies in the functions INKEY() and INKEY\$. These act just like GET and GET\$ except that they have a built-in time limit in the form of a figure in brackets following them.

This figure decides how long the program will wait for a letter to be entered into the keyboard buffer - assuming that there isn't one already lurking there.

Once the specified time period is exceeded the program carries on from the next line. It signals what it's done

by having INKEY() return -1 and INKEY\$() return the null or empty string.

The parameter in brackets is measured in hundredths of a second.

Program V shows INKEY\$() being used with a delay of one second (100 hundredths). If you manage to give it a letter inside one second then this is stored in *letter\$*.

Should the time limit be exceeded our impatient program shows its displeasure by showing the null string into *letter\$* and going onto the next line. This prints out one of two messages as appropriate.

```
10 REM Program V
20 PRINT "Give me a
letter"
30 letter=INKEY$(100)
40 IF letter="" THEN
PRINT "You were too slow"
ELSE PRINT "You gave me the
letter ";letter$
```

Program V

The use of INKEY() is shown in Program VI.

```
10 REM Program VI
20 PRINT "Give me a
letter"
30 letter=INKEY$(50)
40 IF letter="" THEN
PRINT "You were too slow"
ELSE PRINT "You gave me the
letter ";CHR$(letter)
```

Program VI

Here the delay is half a second. If there's been no response to the prompt by then, -1 is stored in *letter*. Line 40 prints the relevant message, with CHR\$ again being used to translate from the Ascii.

Like GET, INKEY() tends to be used with a dummy variable to make a program wait until a key has been pressed. However, because of the time parameter it is much more useful, allowing an upper limit to the delay.

That's where we'll leave INKEY() for the time being. It does have another use but that's for next time when we'll also be taking a look at the @@ which we met last month.

**YOU** know folks, one of the most entertaining times of the day in the editorial office is the morning mail session.

To the accompaniment of the sparrows coughing outside, we do a quick scan of your letters, separating them into categories such as Micro Messages, submissions for publication, comments and suggestions for improvement, and in particular those that contain praise for the games written by amateurs not on our staff – as opposed to the amateurs on the staff.

This is done so that later, when everybody has come down off the ceiling and Roland's finished oggling the Sun, the team can tackle the letters together.

During the last few months we've received sackfuls of mail on all sorts of topics.

Particularly enjoyable are those that praise the magazine content, those that offer constructive criticism and suggestions for improvement, and in particular those that contain praise for the games written by amateurs not on our staff – as opposed to the amateurs on the staff.

Queries from people who have typed in listings incorrectly and can't get the programs to run have introduced a host of wonderful characters whose existence we've never suspected.

I'd like to introduce you to some of them by quoting short sections from letters, and if on reading them you recognise yourself, please don't take offence, as none is intended.

The first character is the *chess player*: "I always check everything thoroughly. I've checked and double checked but..."

A variant is the *railway employee*: "I've checked every line and there isn't a single fault to be seen".

Our favourite is the *typist*: "As I have years of experience using a typewriter the chance of any errors being mine are extremely unlikely".

That one's followed closely by the *postman*: "I've checked every single letter and I can't find anything wrong".

More dubious is the *pot smoker*: "I've passed it around among my friends and they all agree there's nothing wrong with it".

Rather more serious is the *doting parent*: "I got my Johnny an Electron for his birthday and he had a lot of fun



# TYPE CASTINGS

**ALAN McLACHLAN takes a light-hearted look at the folk who type in listings . . . and the problems that beset them**

with it until he typed in your Skramble.

"He spent hours typing it in and it's not fair as he cannot get it to work. There must be a mistake in it as it keeps coming up Syntax Error all over the place".

He's the one who says everyone is out of step but our Johnny.

A similar case is the *ice skater*: "I've been backwards and forwards over it till I'm blue in the face, and I'm still no further".

And of course, the inevitable *accuser*: "Having tried all weekend to get your program to run, I'm sure you put deliberate errors in to make people buy your monthly tapes".

A more dreaded character is the *improver*: "Your program does not work properly. The following additions will stop the manic mole going outside the maze". (It never did on our original version, but you try convincing him.)

As a Spielberg freak the editor is fond of the *film fan*: "We've searched high and low for Gremlins but can't find any. They seem to be hidden away in the listing and we're just not good enough to find them".

Of course there's the *happy family*: "We are not normally the types to complain, but all we have is 'Arguments' all

over the place".

We all like the *Rentokill man*: "I've got rid of all my bugs but I think you must still have some, but I can't find them", and the *motor maniac*: "I've run over it time and time again and I'm sure I'm right".

These are closely rivalled by the members of the *search party*: "We've checked every entry and there's nothing unusual to be seen", and the more evil *masochist*: "I've made a painstaking check of my listing and can only assume yours to be in error".

There's the *put of work G.P.*: "I must admit I have run out of patience" (think about it) and the *racing driver*: "I've been through it time and time again and it's driving me round the bend".

Saddest is the *Optimist*: "I have been told by your telephone receptionist to write in as I am desperate. I have typed in four of your games and can't get any of them to work".

"I have saved them all on this cassette so that you can look at them for me and find out where I've gone wrong. I am an absolute beginner and don't know where to start looking for errors".

There was also a letter from one irate young chap that read something like this: "I typed in your listing of Skramble and

got 'Syntax error at 550'. So I deleted that line and got 'Syntax error at 560'. So I deleted that. Now the program won't run at all. I wish you'd check these things before you publish them".

And another that contained: "I then tried Bounce Ball which took me four hours to type in (two fingers). When I came to run it the computer did not seem to like the term PROC in any shape or form. When I took them out the program would not run past line 240. Have you tried the game before publishing it?" Really, I ask you!

At least the optimist admitted that the faults were probably hers. Unfortunately, we just don't have the time to provide a debugging service and certainly not over the phone.

Out of curiosity I took this particular cassette home one weekend and found in the four programs no less than 47 typing errors and four missing lines.

It took me 10 hours looking carefully through the listings and checking every entry against that in the magazine. Apart from four errors which I couldn't find without some useful debugging techniques, all the mistakes were plainly visible.

OK I agree that to an



experienced eye they will be more obvious than to an inexperienced one, but they were there to be spotted with careful scrutiny.

I'm not going to keep the debugging techniques to myself and intend, with the assistance of the rest of the lads, to write a couple of articles on hints and tips to help you find your own programming errors.

Here's an example to be going on with. I've picked a short simple line for a demonstration, but the trick will work with much longer, more complicated ones.

Let's assume you've typed in Manic Mole from the July issue, and instead of the correct version of line 1680 which reads:

```
1680 PRINTTAB(15,29) Press
SPACE*:REPEATUNTILGET=32:
CLS
```

you have typed in, incorrectly I might add:

```
1680 PRINTTAB (15,29) Press
SPACE*:REPEATUNTILGET=32:
CLS
```

Your micro will respond with the message 'No such variable at line 1680'. If you don't know what you are looking for, finding the mistake which has prompted this message can be a pain.

You can make the debugging job that little bit easier by splitting the line at one of the colons. We'll split it at the second, but on a longer line you would find it better to split it near the middle.

Put the Basic statements in the second half of the line on a separate line, as follows:

```
1680 PRINTTAB (15,29) Press
SPACE*:REPEATUNTILGET=32
1685 CLS
```

You will still get the error message 'No such variable at line 1680'. Now split that line and make a new one from the second half and you will have:

```
1680 PRINTTAB (15,29) Press
SPACE*
1681 REPEATUNTILGET=32
1685 CLS
```

The resulting error message will still be the same but look how we've narrowed it down to just a few characters.

Gradual elimination will leave you with the offending



statement on its own. Your micro can't tell you exactly what is wrong with it but with careful checking and perhaps experiment you should come up with the solution.

By the way, the cause of the error in the example, was the space between the TAB command and the first bracket.

The Electron saw the word TAB separated from its bracket and took it as an undefined variable.

You may have been able to spot this one straight off if you're quite good at finding your own mistakes, but imagine if the line had been a very long multi-statement one and the error had been really obscure.

This is a fairly easy technique which can be used for many error messages. We'll look at some more another time.

By the way, if all your debugging sessions have failed and you have been the postman, the pot smoker, the ice skater and any other of our friends, then drop us a line with details of the problem and any relevant error messages.

But a few words of advice:

- Don't expect an immediate reply. We're as fast as we can be, but we are snowed under.
- Do include a self-addressed envelope complete with a stamp.
- We just don't have time to debug cassettes.

We can't promise to solve all your problems, but we try our best or at least admit defeat. The request for an a.s.e. also applies to any other type of mail if you want a personal reply.

Well that's it. I'm going to get some practice now at finding some of your errors, which are amazingly like my own. I'll put some of the techniques into practice in another session.

## BBC/ELECTRON PROFESSIONAL SOFTWARE

Our educational software is used in thousands of schools and homes throughout Great Britain.

### EDUCATIONAL 1

Hours of fun and learning for children aged five to nine years. Animated graphics will encourage children to enjoy counting, maths, spelling and telling the time. The tape includes six programs: MATH 1, MATH 2, CUBECON, SHAPES, SPELL and CLOCK.

... 'An excellent mixture of games'... Personal Software - Autumn 1983.

### EDUCATIONAL 2

Although similar to Educational 1 this tape is more advanced and aimed at seven to twelve year olds. The tape includes MATH 1, MATH 2, AREA, MEMORY, CUBECON and SPELL.

### FUN WITH NUMBERS

These programs will teach and test basic counting, addition and subtraction skills for four to seven year olds. The tape includes COUNTING, ADDING, SUBTRACTION and an arcade type game called ROCKET MATHS which will exercise addition and subtraction. With sound and visual effects.

These are excellent programs which teachers on the project have no hesitation in recommending to other teachers... Computers in Classroom Project

### FUN WITH WORDS

Start your fun with alphabet puzzle, continue your play with VOWELS. Learn the difference between THERE and THEIR, have games with SUFFIXES and reward yourself with a game of HANGMAN.

... 'Very good indeed'... A&B Computing - Jan/Feb 1984

### JIGSAW AND SLIDING PUZZLES

There are two jigsaw and four sliding puzzles on a 3 x 3 and 4 x 4 grid. Each program starts off at an easy level to ensure initial success but gradually becomes harder. It helps children to develop spatial imagination and in solving problems. The tape includes: DOLING, JIGSAW, HOUSE, NUMBERS, CLOWN and LETTERS.

\*\*\*SPECIAL OFFER\*\*\*

Buy three tapes and deduct £4.00

Add 50p p&p per order. Please state BBC or ELECTRON or 40 or 80 track for discs

Golem Ltd, Dept E, 77 Qualitas, Bracknell, Berks RG12 4QG. Tel: 0344 50724

## ELECTRON SOFTWARE BARGAINS from POTTER PROGRAMS 'THE HOTTER PROGRAMS'

Send a S.A.E. for our full list of cut-price software for the Electron, which includes the Big value Computer Hire 10 from Beasly, as seen on T.V. For our fully inclusive price of only £8.45 you get the following 10 games on two cassette tapes: Chuckie Egg, Ghoulis, Guburn's Castle, Special Operations, Tales of Arabian Nights, Eddie Kidd's Jump Challenge, Killer Gorilla, Night World and Gauntlet.

All our games are original and are not at all inferior to advertising. No order delays and speed delivery. Orders outside the UK please add £1.00 per tape.

Also available direct from Potter Programs our fantastic adventure games.

\*NEW RELEASE - RETURN OF FLINT 32K

The sequel to the very popular SUPER AGENT FLINT. As the Super Agent you have successfully dodged your captured rocket with the British Space Station, only to find that it has been infiltrated by the deadly T.E.R.D. organisation. This is where your mission begins. Price: £2.95

THE STAFF OF LAW 32K

Can you track down the Staff of Law and meet its potent Earth Power to defeat the Despoiser? 'Extremely finished and worth buying' *Electron* Price: £2.95

SUPER AGENT FLINT 32K

The dreaded T.E.R.D. (Terrorist for England's Ruin and Destruction) organisation has reared its ugly head. Only you as Super Agent Flint can capture their interstellar rocket and secret plans. 'Quite fast and fun to play' at the price (most recommended) *Electron* User Price: £2.95

GALADRIEL IN DISTRESS 32K

The Princess Galadriel has been abducted and an evil spell holds her prisoner. You must seek aid from the Wise Lore-Master to release her and save yourself from the wrath of King Theoden. Price: £2.95 All adventures with full save game facility for the Electron or BBC B. Price £2.95 each OR SPECIAL OFFER: Any three games for £5.95 OR ALL FOUR games for only £7.95. Please add 50p p&p per order (£1.00 for orders outside UK). Also limit sheets available 20p each game.

Send cheque or P.D. with your order to:

Dept E11, Potter Programs, 7 Warren Close, Sandhurst, Camberley, Surrey GU17 8JR. Tel: 0252 677608.

WANTED: Two quality programs for the Electron/BBC B in machine code or Basic. Send us a copy of your program on cassette for evaluation. Generous royalties paid if accepted. Absolute confidentiality is guaranteed.

Product: Starword (16k ROM)  
Price: £34.50  
Supplier: Slogger, 215  
Beacon Road, Chatham,  
Kent. Tel: 0634 811634.

# The WP system with some tricks up its sleeve

**STARWORD** is a powerful ROM-based word processor from Slogger. To use it you'll need either Slogger's Rombox or some other expansion which enables ROMs to be plugged in.

Its 16k of software has been designed specifically for the Electron — it is not an adapted BBC ROM.

On power up or after Ctrl+Break you're straight into Starword in 80 column mode. It's basically the same format as Acornsoft's View.

I found it a little hard to get started at first but after a while things began to get easier.

It's probably the fact that I use View so much and have got used to using that rather than there being any question of Starword being difficult to use.

There are two modes, command and edit. In the first you can enter commands such as LOAD, SAVE and so on. Text is entered in edit mode.

Text in the default 80 column mode is rather hard to see as I don't have a monitor and resolution is not too good on my colour TV. However this is simply solved — 40 column mode is accessed by typing in 40 while in command mode.

This appears at first to be the normal run of the mill word processor, but Starword has up its sleeve some rather unusual tricks.

For instance it has the ability to personalise a standard letter to all those names entered into a mailing list file, each letter then being headed and printed for each name in the file.

It works well with all sizes of documents and enables short documents to be merged in the form of a long report or letter.

Conversely, when dealing with extra large documents Starword can split the text into several smaller chunks. The PRINT command can be followed by a list of filenames which enables the files to be printed as one document.

Disc users have an even

greater advantage, as they can process the document continuously. You select this with the Edit command, specifying an input and output file.

The first batch of text can be read in and edited. Typing MORE saves the current text and reads the next chunk into memory, and so on.

Starword comes with a very comprehensive instruction manual. It is good, but takes a lot of reading. I found it difficult to remember all the commands at first, so keep the manual to hand.

The first section of the manual is for anyone completely new to the world of computers and word processors, which to me is a good attribute.

You can miss out the first couple of sections if you're conversant with ROMs and computers and move on to the excellent tutorial.

This takes you on a guided tour of the commands, control keys and functions, vital in making best use of Starword.

Because it's so close to the cursor keys Break has been protected. When pressed you are asked if you want to restore the old text.

Escape toggles between command and edit mode. In command mode there are around 26 commands, plus access to the operating system and other ROMs through star commands.

NEW clears all text, as does LOAD, whereas SAVE saves the text. It can also be SPOOLED or PRINTED. The colour of the text is easily selected with COLOUR.

Tabs can be set and the left and right margins defined. There are global and selective

search and replace functions.

In edit mode word wrap is automatic and text can be entered in insert or overwrite mode with justification and formatting off or on.

A ruler shows the width of the text currently being edited, which can be up to 132 characters wide.

The screen display is a window on the text and can be scrolled up, down left or right. The cursor can be moved a character, word, line or screen at a time.

At the bottom of the screen there is a text window where all messages are displayed.

At the top is the cursor column number, ruler and status such as format details.

Headers and footers can be defined, plus their margins

text to be altered by inserting printer control codes into the text.

The default printer driver is for Epson compatible printers. Other drivers are available and can be created with Slogger's printer driver generator ROM, designed specifically for Starword.

Multiple copies of the document can be printed, and you can specify the page to start at and the page to end. One document can be printed while another is currently in memory.

I think this is an excellent word processor for the home business or semi-professional user. It is a very powerful tool providing nearly all the features of larger professional word processors.

I would dearly have loved to have this one available earlier on in the Electron's career — this sort of quality software has been too long a time in appearing for the Electron.

I will definitely be using Slogger's Starword in the future. For a start, I'll use it in my capacity as secretary of a local club to produce letters to all the members which previously took a long time. I'm busy making a mailing list up now.

At long last the software/hardware makers are waking up to the potential of the Electron as a serious computer. This can only benefit both themselves and the user.

If you are looking for a comprehensive and powerful word processor then this one from Slogger must be given very serious consideration. It is certainly the most powerful one currently available for the Electron.

**By DAVID  
RICHARDS**

from the page top or bottom and text. It even allows two sided documents, such as the pages in a book, to be written.

When this function is enabled the headers and footers are swapped from left to right and space is left for the binding at the correct side of the page.

Blocks can be defined which can then be moved, deleted, copied, saved, loaded, formatted and so on. Cut and paste is quite easy.

The function keys have been defined to enable the more commonly used commands to be called without too many keystrokes. These may be programmed with your own definitions.

Starword allows the style of



# Notebook

Get to know  
recursion  
backwards...

IF you can cast your mind back to the October 1984 issue of *Electron User*, you may remember the Palindrome tester. It was a program that used MID\$ to reverse a string and see if it read the same backwards as forwards. This month's program also reverses a string, but now the method used is recursion.

## PROGRAM NOTES

- 30 The string to be reversed is held in the string variable *mirror\$*.
- 40 This line calls PROCReverse, the procedure that does the reversing. The *mirror\$* in brackets after the procedure name tells the procedure which string to reverse. It's known as the parameter that's passed to the procedure.
- 50 Displays the result of the reversing.
- 60 Stops the program running on into the procedure definitions.
- 70, 130 Form the boundaries of the lines that make up the procedure. Notice that in the definition the procedure name is PROCReverse(word\$). The parameter *word\$* is used throughout the procedure definition. However, when it is called with PROCReverse(*mirror\$*), the string held in *mirror\$* is used wherever *word\$* occurs.
- 80 The variables *length* and *letter\$* are declared local to the procedure. This means that the same variable names can be used as the procedure is called again and again, without them interfering with each other. Don't worry how it's done, the Electron keeps track of things. Try leaving this line out and see the chaos that ensues.
- 90 Stores the length of the string *word\$* in the local variable *length*.
- 100 Takes one letter from the left side of *word\$* and stores it in *letter\$*. This is akin to making a note of the money in the box.
- 110 Does one of two things. If *word\$* is only one character long, *reverse\$* (which will eventually hold the reverse of *mirror\$*) is set to the null string. This corresponds to finding no more boxes to open. However if *word\$* is longer than one character then the RIGHT\$ reduces *word\$* to what is left after *letter\$* is removed and then calls the

procedure again. This is like finding another box and going on to open it. Notice that the program goes on calling the same procedure (which does the same job each time but with a different parameter) until the parameter is one character long. It doesn't get to the next line until this condition is satisfied and all the procedures start "unwinding". The first time round **recursion** is obviously more than one character, so *r* is taken off it and the procedure called again with **ecursion** as its parameter. This is still longer than one character, so *e* is split off and the procedure called again using **ursion**. This carries on until the final *n* when the program stops calling procedures and at last gets to the next line.

- 120 Now comes the bit that corresponds to the totting up of the numbers. As each procedure comes to an end each letter that has been separated in that particular procedure is added to the end of *reverse\$*. Try adding:

115 PRINT *letter\$*

- to see how this happens.
- 130 Ends the procedure, sending the Electron back to the program line following the one that called it.

If you add the following lines to the program, you may get a better idea of what's happening:

```
25 count=9
26 MODE 0
125 PRINT "Procedure call ";count;
adds "letter" to make reverse$ contain
"reverse$
126 IF count<>1 THEN PRINT "NEXT:"
ELSE PRINT
127 count=count-1
```

# From Page 27

SUPPOSE someone gave you a box and said that inside it were a number of smaller boxes, one contained within the other like a Russian doll. As well as the smaller doll, each box also holds some money. Your job is to find the total of money in all the boxes. How would you go about it?

One way is to open the outside box, make a note of the money found there, open

the smaller box, make a note of the money in that, open the still smaller box you find with that money, make a note of the cash you find in that and so on. You carry on until there are no boxes left unopened and then add up all the figures you had noted as the process proceeded.

Notice that you can't figure out the total until every box has been opened. Only when the condition that

there are no more boxes to be opened is true can you be sure that you've got all the sums of money to be added together.

This method of repeating the same actions over and over until a finishing condition and then going backwards using the results from each successive step is called recursion. And it's a lot easier to use than to explain!

```
10 REM Recursion backward
20 REM TREVOR ROBERTS
30 a1rrors="recursion?"
```

```
40 PROCreverse(a1rrors?) string to be reversed
50 PRINT "The reverse of 'a1rrors' is 'reverses'" procedure call
60 END
70 DEF PROCreverse(words)
```

stops procedures  
clashing

strips off one letter  
from word#

```
80 LOCAL letters,length
90 length=LEN(words)
100 letters=LEFT$(words,length)
```

```
110 IF length=1 THEN rev=words
ELSE words=RIGHT$(words,length-1):PROCreverse
120 reversed=reversed+let
```

calls procedure if string is more than one character  
collects the letters as the procedures each finish in turn.

```
130 ENDPROC
```

Trevor Roberts

# Look out for Orbs of Aalinor



**GOOD news this month is that Potter Programs is to release a new machine code adventure called Orbs of Aalinor.**

Potter is well known for the value for money its programs offer and Alan Potter tells me that this new adventure is extremely difficult. Look out for it.

I'm sure many of you have at one time or another come across an adventure that you simply can't stop playing. I certainly have.

The most recent one for me has been **Woodbury End**, from Shards. I have had it in for review for a few months now, and I still haven't cracked it.

I keep thinking I'll just solve the latest problem and then review it. Problem is (sorry!) that I keep coming across more problems.

Now Shards has let me know that it has been cracked — twice. Regular readers will have seen H. Bastien's name appear quite frequently in these pages and he is one of the people who've done it.

Until I can crack it personally I'll give you a brief synopsis of the game.

Aliens take over a country town and adopt human form to make themselves indistinguishable from the real inhabitants.

Twenty years pass, and the children of the town begin to act strangely. Can you identify and deal with the aliens and save the children from a ghastly fate?

The cassette cover shows a specially commissioned picture of Woodbury End and the first 50 purchasers to solve the game will receive prints of this picture — which means there are 48 prints left to win.

So far I have found it to be

extremely devious and the kind that I keep coming back to.

In my opinion it is one of the best three adventures available on the Electron at the moment and I highly recommend it.

I have been asked to explain why I refer to Scott Adams games when they are from Adventure International. The first adventures were written by Scott Adams and he set up his own company, Adventure International, to market them.

There are a whole series of games written by Scott, but also some written by programmers in his company.

Games like Gremlins and Robin Hood are company-produced, so I tend to classify them separately from Scott Adams' games. I hope this clarifies things.

I have been taken to task for a couple of things this month.

Firstly, I'm sure you all spotted the mistake I made in

February's column. Well for once it wasn't my mistake. One of the proof readers, on reading my little pun about the food, assumed I had misspelt stake! My apologies once again, I'll get it right soon.

David Hiddart thinks I shouldn't give answers for readers who write in with problems for adventures that are only available on the BBC Micro.

All Electron adventures, except for **Rick Hanson** from Robico, another brilliant game, which pokes the Electron's screen memory, will work on the BBC Micro, as we all know.

However the reverse isn't true, but BBC owners don't seem to know this. I don't want to discriminate against them for not buying the best computer on the market, so I try to answer their questions.

Anyway, there isn't a column like ours for them, so I take pity on them.

Incidentally, David also

asks whether I will do a special on **Wheel of Fortune**. There is one in the pipeline, so watch out for it.

Nick Southgate wants to know why I haven't mentioned that he sent me the solution to the anagram in **Sphinx Adventure**. I get hundreds of letters each month and try to pick out things from them that I think are interesting but only when they haven't been mentioned recently.

For instance, until I did the Sphinx special I regularly got about 50 letters a month asking the way to the vampire's castle. You'd all get fed up if I put that in every month, wouldn't you?

When readers send in answers to problems, such as the anagram, I tend to give the names of the first few, otherwise I'd end up, in this case, listing about 80 names.

I tend to assume that everybody is dedicated to computing in general and adventures in particular and I try to put in things that haven't been mentioned before because I assume everyone has got all the back issues of **Electron User**. If you haven't, it serves you right!

However, every letter I get with an SAE is answered, and I guarantee that. So, are you happy with the way I run this column?

It is your column after all, so write and let me know what you think.

I'd also like to know what you think about a compilation of all my columns to date with some maps and solutions added.

Right, enough trumpet blowing. Thanks are due this



Extremely devious — and I still cannot crack it!



## From Page 29

month to Nick Southgate, for a complete solution to **Galadriel in Distress**, G. Ward for a belated but welcome solution to **Sphinx Adventure**, Paul Taylor for his cheat-sheets for **Hampstead** and **Crown Jewels** and K. Schadewald for his solution to **Greedy Dwarf**.

Robert Henderson has written in to explain how **Sphinx Adventure** can be listed. Load in the machine code "Bad program" fixer from the



December issue and then CHAIN Sphinx as usual.

When it is loaded, press Ctrl+V, then 6 and then type CALL &D01. The game can then be listed, and since it is in Basic, a save-game routine can be added.

Robert also points out that you can go to any part of the game by changing the value of PROC(L) to the line number of the location you want.

This is an excellent tip, and if Robert sends me in a list of his adventures I will send him a tape. If anyone can improve on Robert's idea by incorporating a save-game routine and producing a working version with it in, I will reward them with a tape too. But don't forget that list of adventures.

## PROBLEM CORNER

Russell Blake — thanks for the **Gremkins** tips — is having problems with **Quest for the Holy Grail**. He has chopped the tree down and cut it up to make the logs, but cannot make the raft. You need half the rope to tie the logs together.

He is also stuck in **Fantasia Diamond** and **Secret Mission**. In the first, to get

through the trapdoor keep hitting it. In the latter, you can't get through a second window.

Christopher Lowe, Martin Haig and Patrick Ball are all having trouble with **Adventure**. Water the plant to reach new heights.

Bread, what bread? The diamond is up that plant. To get into the dungeon and get the last treasure, go into the desert and, providing you have the keys, drop one of your treasures and then "steal" it back.

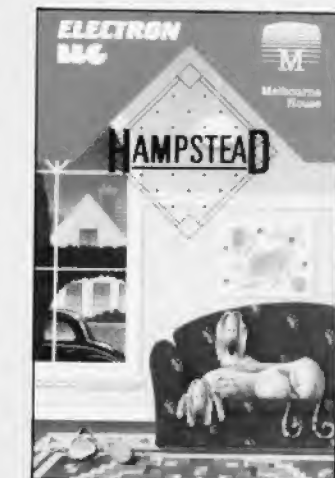
Say OPEN SESAME to get into the caverns. The slipper is a red herring and, for John Tipper, a red herring is an object that is meant to look useful but which plays no part at all in the game.

**Hampstead** is popular this month. Perry Spencer wants to know if the china dogs and lathe bracket are used (not as far as I know, and yes) and how do you meet the man on the train — wear, read and carry something a bit more up-market (the bracket will help).

Jonathan Caslake wants to know how to open the filing cabinet. Use something in a desk in the department store.

Nick Southgate wants to know how to avoid having your pockets picked. Don't go there!

Derek Willoughby says that my advice to see chubby doesn't work. It does if you have done everything you



Don't go here if you want to avoid having your pockets picked!

should have!

Richard Jay insists that the **Hampstead** hintsheet says that you need the Sony Walkman. It doesn't. Try reading a magazine.

Junior Lumsden's younger brother (sic) wants to know how to get money and how to get on the train. Cash your giro and rest a while in the park. Buy a ticket.

Simon Stead and Susan Parsons have both written in

about **Dracula Island**. To open the coffin you must use the hammer.

Use what you find to get past the native and you'll also find the answer to the door in the courtyard.

Simon Stead is also stuck in **Ring of Time**. You need a sword to kill the mad monk and once you have done this you will find the rope.

The combination is on the parchment, so it's not a red herring. Watch out though, the parchment is used twice.

**Castle Quest**, a BBC game, has Trevor Gonsalves puzzled. To finish the game, find the two patrolling guards near the troll. Get past them and throw the wand to the right.

Positioning is critical, so you will have to keep trying until you get it right.

Simon Stead, S.D. Webb and Harvey Reynolds are stuck in **Pyramid of Doom**. As regular readers will know, there is a bugged version of this game in circulation.

The method to use to get into the pyramid is get a key out of the pool and one from digging in the desert. Dig by the pyramid.

Use both keys to open the doors and enter the big door.

## BUG HUNTERS

W.E. Trevelyan has written in with more information about the bugs in **Classic Adventure**:

- Saved data cannot be reloaded because the OSFILE calls are incorrectly coded.
- The program hangs when entering the vending-machine location. Note: you don't need to go here anyway.
- It also hangs at the dead-end near the volcano.
- The spices could not be collected.

I know of some of these

bugs, having found them myself. I have managed to get the spices though, so there may be different bugged versions about.

Mr Trevelyan has contacted Melbourne House and they have sent him a working version of the game. I also have contacted them and they are sending me the same version, so I will report back about it.

If you have the bugged version, contact Melbourne House direct (the address is in the cassette insert).

## SOS

Harvey Reynolds wants to know what words to use and when to use them when trying to play the mirror in **Ghost Town**.

He also wants to know whether you can bring the two telegraph keys together or not. Can anyone help?

S.D. Webb writes that he has **Hareraiser** and can't get started. I have never seen the game so can't help him, can anybody else?

Joshua Bridgens younger brother (yes, another one), wants to know if you can get on to the fourth level in **Hell-Hole** without going over the pit.

Unfortunately, I don't have room this month for the Hall of Fame and Feedback. These sections will be back next time with tips from Paul Southgate, Paul Edmans, Mike Herring, Jason Palmer and David Carlton. Why haven't I got your tips yet?

Watch out for the stone falling on you.

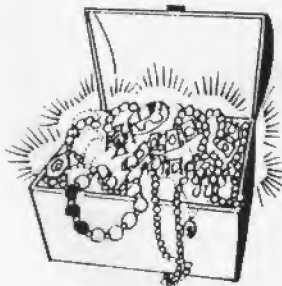
If this doesn't work you have the bugged version.

Does anyone know yet whether this is a genuine bug or is caused by the Plus 1?

What do you want to move

forest. Use what you find at the cliff overlooking the spaceship near the start location. Get the laser and use the parachute again.

**Wheel of Fortune** is causing trouble, too. Jonathan Stewart can't extend the



the altar for, Harvey? Search the fireplace and then clean what you find to reveal the ruby.

You can't get the acid. The bones and chopping block are red herrings and the rats are an obstacle. There is another route you should take. Use a dropped skull on the metal rod. Shoot the nomad.

Julie Atwill says that she has used diaxes to open the safe in **Sphinx Adventure** but can't get into it. Go up.

Paul Dougherty, Scott Clark and Darren Clifton all want to know whether the laser is and how to use it in **Stranded**.

Climb one of the trees in the

ladder to get across the pit. You must be doing something wrong. How did you extend it to get the bucket?

David Ashbury wants to know how to stop the beggar from pushing the ladder away and how to befriend him. Doing the second will stop the first, so think what you usually give to beggars.

S.D. Webb needs help to get into the machinery housing door and past the troll. Use the hairpin to keep picking the lock. What do a basket, a charming Indian and a flute have in common? Use the answer to get past the troll.

This month I have had my

first question about Adventure International's superb new game **Robin Hood**. To get out of the dungeon stand on someone's shoulders and grab the guard's ankle when he walks past.

Search him to get his sword, force the lock on the grating and undo the bolt.

Andrew Foxall and John Tipper have written in for help with **The Count**.

Forget the vents and the daises. From the ledge just GO WINDOW. You can't get into the oven.

If you find you suffocate in the coffin it is because you haven't used a sharp object to break the bolt. Try GO TOILET for a laugh, but that's all it is. Only the torch can be found in the dungeon.

A puzzled Nick Southgate needs some answers to his problems in **Eye of Zoltan**. Where are the gloves? Inside the wardrobe in the wizard's bedroom.

Where is the money for the old man? In the woodcutter's hut. Where is the small key for the wardrobe (and the chest)? E-S-E of the crossroads.

Nick also wants to know what he needs to dock the rocket in **Super Agent Flint**. You must insert the correct disc into the rocket's disc drive and be wearing the helmet and suit.

For all those of you who haven't managed to map the witch maze in **Twin Kingdom Valley**, and especially for Shaun Haughton, here are the various routes.

Passage (with rod) -S-N-E-W-Witch-E-E-S-N-Passage: Bone room -S-W-S-E-Witch-W-W-W-S-Bone room.

Staying with TKV, David Ashbury wants to know what the secret of hidden doors is and Neil Johnston wants to know how to get to the armoury through the small crack and why he sometimes meets the giant and sometimes the princess when he goes into the dungeons.

Some doors are invisible until you swim in Watersmeat. Don't try and get through the crack - a silver door will give you egress.

There are two dungeons and two bronze doors - you are mixing them up.

Richard Jay can't get past

the tiger in **Stolen Lamp**. This is one occasion when you do need a red herring.

It seems as though everyone has questions to ask about **Spiderman** this month. Hydroman is averse to temperatures below 32 degrees.

If you haven't found out how to get the bio gem, try using your web from outside.

Ice block? I don't remember there being one. Can anyone help?

Use your web on the fan. Mysterio's cloud is a bit of a poser. Try JUMP and UP. Electro won't be a problem if you are holding Dr Ock.

David Ashbury wants to know how to get past the rock without it falling on his head in **Castle Frankenstein**. I presume you mean the rocks that Igor throws at you when you are in the steep slope at the side of the castle. If so, wear something to protect your head.

Mike Herring would like some help with **Pettigrew's Diary**. The code for the fun house is 58. Barry's room number is 40. The old man in Hyde Park? Shout KULFATYN.

John Tipper is stuck in an adventure that I haven't seen in ages and no longer have a copy of, **Wizard of Akryz**. He wants to know how to get out of the palace and what to use the spectacles for.

As I remember, you examine a chest in one of the corridors - this has a secret panel - and exit from the palace. You'll need the glasses underground.

John is also stuck in **Adventureland**. You'll need the firebrick to deal with the lava. The bear is a rather timid creature and prone to sudden jumps at loud, vocal noises.

You can get in and out of the bee's lair if you take a mud-bath first.

What do you want to get gas for the torch for? Use the matches. The gas can be got in an empty wine bladder though.

To get the golden fish you must use the bottle but have the golden net with you.

Finally, John also needs help with **Pirate Adventure**. Yes, it is OK to give rum to the pirate, and you need a fish to get past the crocodiles.

Now combined in  
two fun-filled  
packages... all  
the traditional  
card and board  
games you've  
been asking for  
- again and again!



9 Classic card &  
board games

No. 1



Electron  
cassette  
can also  
be used on  
the BBC Micro

For the BBC Micro and Electron

9 Classic card &  
board games

No. 2



For the BBC Micro and Electron

Electron  
cassette  
£5.95 each

3½" disc  
£7.95 each

TO ORDER, PLEASE USE THE FORM ON PAGE 61



**PETER** Rabbit is a greedy guts! He's no longer content with going into gardens to steal lettuce. Now he's trying to find a hidden Easter Egg.

He plans to find the egg and take it to his house — but he has an awkward little problem.

A group of invisible elves keep stealing and hiding the egg whenever Peter finds it. If only he could remember where the elves were standing, he could find a way to avoid them.

The elves are not all bad though. When Peter sets off to find the egg they tell him whether to travel north, east, south or west to find it.

Your job is to guide Peter to the egg and then to the house at the top of the screen.

It requires some luck, but strategy and memory, as well as an understanding of compass bearings, are also needed.

In fact the game, apart from being fun, is a good way of learning the four points of the compass and the use of coordinates.

To enable a three colour Peter to be drawn, he is poked directly on to the screen.

If you've followed the series on machine code graphics in *Electron User* you'll understand how such characters can be created, but you may be surprised to hear that it can be done within a Basic program.

The data for Peter is read from line 440 and the character is printed at line 370. Despite the fact that all the instructions are in Basic, the character moves fairly smoothly from one location to the next.

The program itself is straightforward. Procedures have been given names which tell their purpose, with the main program occupying lines 40 to 220 and the procedures being defined after that.

**Rog Frost**

# The Easter Egg Hunt



## MAIN VARIABLES

**X%** Peter's address.  
**oldx%** Peter's old address.  
**pos%** Square that Peter occupies.  
**help%( )** The elves' squares.  
**loc%( )** Addresses for Peter relative to X%.  
**char%( )** Data for Peter.  
**what%** Data for Egg.  
**egg%** Location of the egg.

Full listing starts  
on Page 34

```

10 REM Easter Egg Chase
20 REM By Roger Frost
30 REM (C) Electron User
40 #FXI202,32
50 MODE6:VDU23;B202;0;0;

```

```

60:
61 PROCInstruct
70 PROCdefchar
80 REPEAT
90 MODE5
100 VDU23;B202;0;0;0;
110 ON ERROR GOTO1388
120 PROCinit
130 PROCgrid
140 REPEAT
150 PROCmovechar
160 PROCcheck
170 UNTILposI=79AND eggZ=

```

```

180
180 MODE6:VDU23;B202;0;0;
0;19,0;4;0;
190 PROCend
200 PRINTTAB(5,22)*Press
Space bar for next game.*:R
EPEATUNTILGET=32

```

```

210 UNTIL0
220 END
230 DEFPROCmovechar
240 moveI=moveI+1
250 oldxI=XI:flagZ=0:oldf
I=XI

```

```

260 REPEAT
270 #FXI5,1
280 getS=GET$
290 IF posI=78 AND eggI(<)
100 AND getS="." PRINTTAB(0
,29)*NO EGG! NO ENTRY!*:60
70350

```

```

300 IF posI=69 AND eggI(<)
100 AND getS="A" PRINTTAB(0
,29)*NO EGG! NO ENTRY!*:60
70350

```

```

310 IF getS="." AND posI
MOD 10(<) XI=XI+24:posI=pos
I+1:flagZ=1:FI=0
320 IF getS="." AND posI
MOD 10(<) XI=XI-24:posI=pos
I-1:flagZ=1:FI=16

```

```

330 IF getS="A" AND posI<
70 XI=XI-96:posI=posI+10:f
lagZ=1
340 IF getS="Z" AND posI>
9 XI=XI+96:posI=posI-10:f
lagZ=1
350 UNTILflagZ=1

```



```

360 PRINTTAB(0,29):SPC(39
)
370 FORNI=1TO16:?(XI+locI
(NI+FXI))=charI(NI+FXI):?old
xI+locI(NI+oldfI))=0:NEXT
380 IF eggZ=100 PROCundra
wegg:PROCdrawegg

```

```

390 ENDPROC
400 DEFPROCdefchar
410 DIMlocI(32),charI(32)
,helpI(8)
420 loscoreI=58:nameI="Th
e Mad March Hare"
430 helpI="An elf says "
440 FORNI=1TO32:READlocI(
NI),charI(NI):NEXT

```

```

450 DATA0,7,1,4,2,4,3,4,4
,14,5,185,6,185,7,7,328,74
,321,120,322,15,323,15,324,1
5,325,142,326,140,327,207,0
,14,9,2,18,2,11,2,12,7,13,1
05,14,185,15,14,328,37,329,
225,330,15,331,15,332,15,33
3,23,334,19,335,63
4,60 DATA0,14,9,2,18,2,11
,2,12,7,13,185,14,185,15,14
,328,37,329,225,330,15,331,1
5,332,15,333,23,334,19,335,
63

```

```

470 ENDPROC
480 DEFPROCdrawegg
490 RESTORE$20
500 FORNI=1TO5:READwhereI
,whatI:?(XI+whereI-FXIIV2I)=
whatI:NEXT

```

```

510 ENDPROC
520 DATA14,96,15,185,328,
15,329,185,330,96
530 DEFPROCundrawegg
540 RESTORE$20
550 FORNI=1TO5:READwhereI
,whatI
560 IF eggZ=100 ?(oldxI+w

```

```

hereI-oldfXIIV2I)=0 ELSE ?(X
I+whereI-FXIIV2I)=0
570 NEXT
580 ENDPROC
590 DEFPROCcheck
600 IF posI=eggI PRINTTAB
(0,29)*EGG FOUND:eggI=100:
PROCdrawegg:SOUND$11,2,100,
50

```

```

610 FOR checkI=1TO8:PROCh
elpcheck:NEXT
620 ENDPROC
630 DEFPROChelpcheck
640 IF posI(<)helpI(checkI
) ENDPROC

```

```

650 IF eggI=100 PRINTTAB(
0,29)*YOU'VE BEEN ROBBED*:S
OUND$11,3,100,50:PROCegg:PR
OCundrawegg:ENDPROC
660 SOUND$11,1,100,10
670 IF posI MOD2=1 AND eg
gZ MOD 10(posI MOD 10 PRINT
TAB(0,29):helpI:"go East"

```

```

680 IF posI MOD2=1 AND eg
gZ MOD 10(posI MOD 10 PRINT
TAB(0,29):helpI:"go West"
690 IF posI MOD2=1 AND eg
gZ MOD 10(posI MOD 10 PRINT
TAB(0,29):helpI:"go ""due N
orth or South"

```

```

700 IF posI MOD2=0 AND eg
gZ DIV 10=posI DIV 10 PRINT
TAB(0,29):helpI:"go ""due E
ast or West"

```

```

710 IF posI MOD2=0 AND eg
gZ DIV 10(posI DIV 10 PRINT
TAB(0,29):helpI:"go North"
720 IF posI MOD2=0 AND eg
gZ DIV 10(posI DIV 10 PRINT
TAB(0,29):helpI:"go South"
730 ENDPROC
740 DEFPROCgrid
750 VDUS

```

```

760 FORrankI=140TO1100STE
P96

```

```

770 IF rankI<1050 MOVE ra
nkI+24,200:PRINT:CHR$(rankI
/96+64)

```

```

780 MOVErankI,232:DRAMran
kI,1000:NEXT

```

```

790 FORfileI=232TO1024STE
P96

```

```

800 IF fileI<950 MOVE65,f
ileI+40:PRINT:CHR$(fileI/96
+95)

```

```

810 MOVE140,fileI:DRAM14
0,fileI:NEXT

```

```

820 PROCHouse
830 VDU4

```

```

840 XI=24064:posI=69
850 FORNI=1TO16:?(XI+locI
(NI))=charI(NI):NEXT

```

```

860 ENDPROC
870 DEFPROCHouse
880 GCOL0,1

```

```

890 MOVE10,910:MOVE1090
,910:PLOT85,1010,950:PLOT85
,1090,950:PLOT85,1040,990:P
LOT85,1060,990

```

```

900 GCOL0,2:MOVE1040,910:
MOVE1040,950:PLOT85,1060,91
0:PLOT85,1060,950

```

```

910 ENDPROC
920 DEFPROCinit
930 moveI=FXI=0

```

```

940 FORnoI=1TO7:helpI(noI
)=RND(10)-1+(noI-1)*10:NEXT
950 helpI(8)=70+RND(7)

```

```

960 #FXI1,0
970 ENVELOPE1,2,5,-3,2,5,
5,5,126,0,0,-126,126,126

```

```

980 ENVELOPE2,3,1,2,3,5,1
0,20,126,0,0,-126,126,126

```

```

990 ENVELOPE3,-1,-2,-3,
20,10,5,126,0,0,-126,126,12
6

```

```

1000 ENVELOPE4,1,-1,-1,3,
3,3,126,0,0,-126,126,126

```

```

1010 PROCegg
1020 ENDPROC

```

```

1030 DEFPROCegg
1040 REPEAT:giFI=TRUE:egg
I=RND(70):FOR noI=1TO8

```

```

1050 IF eggI=helpI(noI) gi
FI=FALSE

```

```

1060 NEXT
1070 UNTILgiFI=TRUE

```

```

1080 ENDPROC
1090 DEFPROCend

```

```

1100 PRINTTAB(12,2)*CONGRA

```

```

TULATIONS%TAB(12,3)*****
*****
1110 PRINTTAB(11,5)"YOU TO
OK "move";"MOVES"
1120 PROCtune
1130 IF move%<loscore% PRI
NTTAB(8,9)"Your score is th
e best.":INPUTTAB(3,11)"Pl
ase enter your name ";name%
:loscore%=move%;ENDPROC
1140 len%=LEN(name%)
1150 PRINTTAB(8,10)"The lo
west score is ";loscore%;TA
B(140-10-len%)/2,12)"scored
by ";name%
1160 ENDPROC
1170 DEFPROCInstruct
1180 VDU(9,0,4,0)
1190 PRINTTAB(10,21)"The Ea
ster Egg Chase"TAB(10,3)***
*****
1200 VDU(28,1,24,30,5
1210 PRINT"As Peter, the E
aster Rabbit, stands on his

```

```

doorstep he knows that some
where""out in the garden a
n Easter Egg lies""hidden.
He sets out on a journey t
o""find it."
1220 PRINT"Peter is not r
eally helped by a band""of
rather mischievous elves.
These""erry little souls
will help Peter""if he's n
ot got the egg by""telling
him which way to go."
1230 PRINT"if Peter meets
an elf when he has""found
the egg, the elf will""ste
al it and hide it again."
1240 PRINTTAB(5,17)"Press
Space to continue":REPEATUN
TILGET=32:CLS
1250 PRINT"if an elf says
'Go East', it does not""ne
cessarily mean Do East. It
just""means somewhere Eas
t of the column""Peter is

```

```

in. The same applies to Wes
t,North and South."
1260 PRINT"The elves do no
t move during a game""but
they will be in different p
laces""in the next game."
1270 PRINT"Can you guide
Peter to the egg""and then
safely back in to his home
?"
1280 PRINTTAB(5,17)"Press
Space to continue":REPEATUN
TILGET=32:CLS
1290 PRINT""The controls
for this game are: "" A
.....North"" Z.....South
"" (.....West"" )....
.East"
1300 PRINTTAB(5,17)"Press
Space to continue":REPEATUN
TILGET=32
1310 ENDPROC
1320 DEFPROCtune
1330 RESTORE1350

```

```

1340 FORN%=1TO39:READpitch
%,dur%:SOUND1,4,pitch%,dur%
: SOUND1,0,0,1:NEXT
1350 DATA128,7,80,7,100,14
,128,7,80,7,100,14,128,3,12
0,3,116,3,100,3,100,3,100,3
,116,3,128,3,128,7,80,7,100
,14
1360 DATA116,3,116,3,116,5
,116,2,116,7,100,7,100,3,10
0,3,116,3,120,3,100,14,128,
3,120,3,116,3,100,3,100,3,1
00,3,116,3,120,3,128,7,80,7
,100,14
1370 ENDPROC
1380 MODE6:PRINT:REPORT:PR
INT" at line %":ERL
1390 *FX12,0
1400 END

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

DUST OFF YOUR ELECTRON  
AT LAST THE BIG ONE'S HERE



## RICK HANSON

THE THRILLING ADVENTURE OF  
EPIC PROPORTIONS

- ☆ 100% machine code
- ☆ 30K of text
- ☆ 220 locations
- ☆ Full sentence interpreter
- ☆ Adventurer's Note Book
- ☆ Complete Help Service

Cassette £9.95 (state BBC or Electron)  
BBC Disc £11.95 (state 40 or 80 track)

Purchase your copy NOW from:-

ROBICO SOFTWARE, 3 Fairland Close,  
Llantrisant, Mid Glamorgan CF7 8QH.  
Tel. (0443) 227354

## C & F ASSOCIATES

### SELECTED ELECTRON PROGRAMS

TITLE	RRP	OUR PRICE
YIE ARKUNG FU .....	8.95	6.95
BLOCKBUSTERS .....	7.95	6.50
BLOCKBUSTERS GOLD RUN .....	9.95	7.50
BULLSEYE .....	8.95	6.95
DEATH STAR .....	9.95	7.50
CITADEL .....	9.95	7.50
BRIAN JACKS .....	7.95	6.50
QUEST FOR THE HOLY GRAIL .....	7.95	6.50
WHEEL OF FORTUNE .....	9.95	7.50
CASTLE ASSAULT .....	2.50	2.25
NIGHTMARE MAZE .....	2.50	2.25
BOFFIN .....	9.95	7.50
COMBAT LYNX .....	8.95	6.75
RICK HANSON .....	9.95	7.95
ASTRO PLUMBER .....	2.50	2.25
DIAMOND MINE 2 .....	2.50	2.25
CLASSIC ARCADE GAMES .....	5.95	4.95
GHOULS .....	7.95	3.15
ESCAPE MOON ALPHA .....	7.95	2.95
CYBERTRON MISSION .....	7.95	2.95
JET POWER JACK .....	7.95	2.95
CROAKER .....	7.95	2.95
POSITRON .....	6.95	2.95
ELECTRON INVADERS .....	7.95	3.15
THE MINE .....	6.95	3.15
DANGER UXB .....	7.95	3.15
RUBBLE TROUBLE .....	6.95	2.95
GAUNTLET .....	6.95	2.95

ALL PRICES INCLUDE VAT AND POSTAGE & PACKING  
(Overseas Orders please add £1.00 per item)

CHEQUES/PO PAYABLE TO:  
**C & F ASSOCIATES**

AND SEND TO  
C & F ASSOCIATES (EU), PO BOX 2, BIDEFORD EX39 3RE  
Tel: (02373) 619



# A NEW BREAKTHROUGH!!!

FROM



**AT LAST!**

## SLOGGER THE ELK TURBO-DRIVER

(DESIGNED BY ANDYK LTD)

**PUTS YOUR ELECTRON INTO OVER-DRIVE  
INCREASES THE SPEED OF YOUR ELECTRON COMPARABLE TO THE BBC**

The ELK TURBO/DRIVER opens up new worlds  
for the discerning serious owner and is also a must  
for all experienced games players!

***No longer be frowned upon by BBC owners***

**THE METAMORPHOSIS CAN NOW BE ACHIEVED**

★★ UP TO 100% IMPROVEMENT IN SPEED ★★

★★ ABLE TO RUN BBC SOFTWARE (Non Mode 7)

WHERE SPEED WAS THE LIMITING FACTOR ★★  
(Such as Acornsoft's Aviator Flight Simulator)

★★ MAKES ELECTRON SOFTWARE RUN FASTER ★★

**CAN BE SWITCHED BETWEEN NORMAL AND "TURBO-DRIVE"**

★★ OPERATES IN ALL ELECTRON MODES ★★

★★ NO SOFTWARE MODIFICATION REQUIRED ★★

★★ COMPATIBLE WITH ALL ADD-ONS

Plus 1, Plus 3, Rombox, Adaptor Boards, etc) ★★

Your upgraded Electron will be returned within 7 days of receipt by SLOGGER

**All Inclusive ONLY £42.00 (VAT included)**

*Fitted, Tested, Including switch, carriage paid both ways PLUS 1 YEARS WARRANTY*

**WHEN ORDERING PLEASE QUOTE T-D1 ON ORDER FORM**

The Upgrade 'TURBO-DRIVER' Kit available (including switch) **£29.95 Incl. P&P**

**PLEASE QUOTE ON FORM T-D2**

Parcel Post  
Amount of  
postage to be  
paid by  
licensee

Date stamp

Postage Forward Parcel Service  
Licence no. GJC1

No postage stamp  
necessary  
unless posted in  
Channel Islands  
Isle of Man or  
Republic of Ireland

**SLOGGER LTD  
107 RICHMOND ROAD  
GILLINGHAM  
KENT  
ME7 1BR**

**P**

### Slogger's unique guarantee!!!

**The guaranteed seven day installation service**  
SLOGGER is providing a unique service with guarantees  
to return your Electron with the "TURBO-DRIVER"

**installed WITHIN SEVEN DAYS OF ITS RECEIPT!!!**

Simply enclose your order with your Electron (in its  
original packing if possible) and send using the "Free  
post" address label opposite.





## SLOGGER



**ROMBOX**

Want to make serious use of your Electron? ... Then fit the ROMBOX and you will have access to a wide range of ROM based software (including many BBC ROMs).

- ★ Superb value for money.
- ★ Runs all good (non mode 7) BBC ROM software.
- ★ Fully compatible with Plus 1 and Plus 3.
- ★ Up to 8 ROMs instantly selectable.
- ★ Supports 8K and 16K sideways RAM.
- ★ Allows further expansion at rear.

**ONLY £44.95**

### STARWORD (16K ROM)

A Professional word Processor for UNDER £35  
★ Does everything VIEW does plus MUCH MORE!  
Designed for the home user, education or small business needs, STARWORD enables even those with limited typing skills to produce and print letters, manuals or reports using the Electron.

- ★ Easy to use.

**ONLY £34.50**

### STARSTORE (ON ROM)

Store and retrieve your names and addresses or any other information with the STARSTORE DATABASE, written specially for the Electron, STARSTORE works with STARWORD for personalising standard letters (mailmerging).

**ONLY £29.95**

### PRINTER DRIVER for STARWORD

Use most printers with STARWORD

**Cassette £7.95 ROM £9.95**

### SLOGGER BUSINESS PACKAGES

ROMBOX-P + STARWORD  
+ STARSTORE + FREE PRINTER ROM.

**ONLY £120.00 BP1**

ROMBOX + STARWORD

+ STARSTORE

**ONLY £105.00 BP2**

**TAPE TO DISC FOR CUMANA TP2CU**  
£19.95

**STARWORD FOR CUMANA** £34.50

**Also available:**  
Vine Micro's ADDCOMM £28.00  
Plus 1 ROM upgrade £7.95

**Also available:**  
A wide selection of Rom Software from other leading manufacturers. Please phone for details.

### AND NOW ... ROMBOX-P

Offers all the features of ROMBOX Plus built-in centronics printer interface and FREE Printer ROM (worth over £20).

- ★ Up to 8 ROMs instantly selectable.
- ★ Selectable 8/16K Print buffer to increase throughput.
- ★ Ideal as a word-processing station with Plus 3 fitted.
- ★ FREE Printer ROM included.
- ★ Superb value for money at **ONLY £69.95**

### STARMON

- ★ Display of memory in: ASCII and binary, decimal, octal or hexadecimal.
- ★ Full support of sideways ROMs.
- ★ Comprehensive debugging facilities, including breakpoints, traces and events.
- ★ "a very professional piece of firmware" ... Acorn User.

**ONLY £22.50**

### ELKMAN

The most powerful ROM manager on the BBC is now available for the Electron.

**ONLY £17.50**

### 16K SIDeways RAM FOR ROMBOX

- ★ Fully compatible with Plus 1, Plus 3, etc.
- ★ No soldering.
- ★ Complete with RAMs.
- ★ Write protect option.

**ONLY £29.95**

### PRINTER ROM

Allows use of sideways RAM as 8K or 16K print buffer and offers a host of useful utilities for EPSON printers. Ideal for all your printing requirements.

- ★ Electron/BBC compatible.

**ONLY £24.95**

### STARGRAPH

Graphics Rom giving screen dump to EPSON printer, printing of text at any angle or any size, circle, ellipse polygons, arc, dotted lines, colour filling plus more.

**ONLY £21.95**

### T2P3

Transfer the majority of cassettes Tapes 2 Plus 3 disk system, for much faster loading.

**ONLY £19.95**

*All prices include VAT P&P UK Mainland only*

**SEND FOR THEM TODAY**

Cheques payable to:  
**SLOGGER LTD.**

☐ Access No. ....

☐ Visa .....

Name .....

Address .....

Signed ..... Tel. No. ....

Send Orders to: **SLOGGER LTD.**  
107 RICHMOND ROAD, GILLINGHAM, KENT

**PLEASE SUPPLY**

**Cost**

1 ..... £ .....

2 ..... £ .....

3 ..... £ .....

4 ..... £ .....

5 ..... £ .....

**Total £**

**DEALER ENQUIRIES WELCOME. TEL: 0634 52303 (2 lines)**

# Bach to basics

**ROBIN NIXON introduces  
a simple music tutor**

BACH to Basics is a simple tonic sol fah tutor in which the computer plays a tune and the pupil plays it back, aided by a graph of notes.

Tunes are entered by pressing the number keys 1 to 8 - 1 for doh, 2 for ray and so on.

The program is designed so that a pupil can start off at a very simple level and subsequently move up through intermediate to advanced levels.

A running score is kept to give the pupil an idea of how well he or she is doing.

Several options are available including four

levels of difficulty, three different speeds and an option to turn screen output off - to make the pupil work by ear.

If you wish to add to the music data place the new data from line 1150 onwards, using 1 for doh, 2 for ray and so on.

Having done that you re-dimension `A%(40,8)` in line 270 so that the 40 is replaced by the total number of music data lines. Then replace the 40 in `m%=RN(40)`

in line 560 with the total number of tunes in your new version.

## MAJOR VARIABLES

LD%	Level of difficulty.
SP%	Speed or tempo of music.
GB%	Set to 2 if the display is disabled.
T%	The pupil's input or note to be played.
NC%	Score.
L%	Temporary score.
A%(40,8)	Data for 40 tunes.
B%(8)	Pitch of each of the eight notes.

## PROGRAM STRUCTURE

210-240	Downloader.
270-280	Initialise.
290-340	Main play loop.
750-1140	Data for 40 tunes.

## PROCEDURES

instructions	Displays the instructions.
select	Selects the various options.
question	Plays a random tune.
bar	Draws a bar of the graph.
sound	Plays a note from a tune.
double	} Display double height text.
double1	

**THE BOSS**

**ELECTRON £6.95**

**NOW FOR THE ELECTRON!**

The most complete, compulsive and entertaining football management game ever!

- 4 divisions • FA Cup • European Cup • European Cup Winners' Cup • Promotion/Relegation • Transfers
- Suspensions • Injuries • Substitutes • Name team • Team selection
- Choose/change team formation • Weekly league tables • Reserve squad



**PEAK/SMART**

Check with your retailer, phone your Access/Visa number, or just note your name, address, computer and game required on the back of your cheque or PD.

**48 QUEEN STREET, BALDERTON,  
NEWARK, NOTTS.**  
Tel: 0836 705230

## ANDYK Ltd.

### EPROM CARTRIDGE

Able to take application software.  
Also one or two ROMs.  
Allows use of utility ROMs. Plugs into Plus 1: **£9.99 + £1 P&P**

### RS423 SERIAL PORT

Has drive capability and software interface as the BBC Model 'B', plugs directly into Plus 1 cartridge slot. Price: **£34.99 + £1 P&P**



**29 STATION ROAD, WESHAM,  
LANCASHIRE PR4 3AA.**  
TEL: (0772) 684573



```

100 REM *****
110 REM *
120 REM * Bach to Basic *
130 REM *
140 REM * Robin Nixon *
150 REM *
160 REM * (c) Electron *
170 REM * User *
180 REM *
190 REM *****
200 REM
210 IF PAGE=LEND THEN BOT
0 250
220 *K.O *CLS: *FX3,2IN4T,
:FOR I=PAGE TO TOP STEP 4:
(LEND-IX-PAGE)=IX:NEXT:PA.
=LEND:MOLD:MUNIN"
230 *FX13,0,120
240 END
250 *FX3,0
260 *FX14
270 MODE1:VDU23;B202;0;0;
0;BIM CH1 8,AI(40,8),BI(8)
:RESTORE 740:FOR J1=1 TO 8:
READ BI(J1):NEXT:RESTORE 75
0:FOR J1=1 TO 40:FOR K1=1 T
O 8:READ AI(J1,K1):NEXT K1,
J1:PROCInstructions
280 LDI=1:SP1=1:BI1=1:MQ1
=0:NC1=0
290 MODE1:VDU23;B202;0;0;
0;:PROCselect
300 MODE 2:VDU23;B202;0;0
0;:PROCquestion
310 VDU 26,4,31,19,8,12,2
6:COLOUR 7:PRINTSPC3:"Enter
the tune":LI=0:FOR J1=1 T
O LD1+2:REPEAT:T1=GET-48:UN
TIL T1=0 AND T1<9:PROCsound:
PROCbar:IF T1=AI(M1,J1) LI=
LI+1
320 NEXT:MQ1=MQ1+LD1+2:NC
1=NC1+4:LD1=VDU 31,0,0:PRINTSP
C20;
330 COLOUR 2:VDU31,0,0:PR
INT"RIGHT *NC1:VDU 31,11,
0:COLOUR 1:PRINT"WRONG *":MQ
2=NC1:VDU 31,5,2:COLOUR 4:
PRINT"SCORE *":INT(INCI+1)/
MQ1+1+100:"T1;
340 VDU 31,3,5:COLOUR 6:P
RINT"Space to play":VDU 31,
4,7:COLOUR 5:PRINT"M for
menu":REPEATUNTILINKEYS(0)
="":REPEAT:G=GETS:UNTILG=
" " OR G="M":IF G=" " BOT
0300 ELSE BOTO 290
350 END

```

```

360 DEFPROCInstructions
370 COLOUR 2:COLOUR 129:V
DU 31,11,1:PROCdouble(" Bac
h to basic *):COLOUR 3:COL
OUR 128:PRINT"
380 PRINT"Bach to basics
(excuse the pun!) is a""si
mple music tutor in which t
he""computer plays a tune
and the pupil""plays it ba
ck.""
390 PRINT"Several options
are available to the""pup
il including 4 levels of di
fficulty,""3 different spe
eds and an option to""turn
screen output off.""
400 PRINT"The program is
designed such that a""pup
il can start off at a very s
imple""level and, as he or
she learns more,""move up
through intermediate to""
advanced levels.""
410 PRINT"A running score
is kept to give the""pup
il an idea of how well he or
she""is doing. Tunes are
entered by pressing""the n
umbers 1 - 8.""
420 COLOUR 3:COLOUR 129:V
DU 31,12,30:PROCdouble(" Pre
ss Space"):REPEATUNTILIN
KEY(-99)=0:REPEATUNTILIN
KEY(-99)=ENDPROC
430 DEFPROCselect:COLOUR
2:COLOUR 129:VDU 31,11,1:PR
OCdouble(" Bach to basic *
):COLOUR 3:COLOUR 128:VDU 3
1,1,21:PRINT"Enter selectio
n or press space to play"
440 RESTORE 640:FORJ1=1 T
O 4:READ A0:IF LD1=J1 COLOU
R 1:COLOUR 131 ELSE COLOUR
2:COLOUR 128
450 VDU 31,(40-LENA0)/2-1
,5+J1:PRINTA0:NEXT
460 RESTORE 600:FORJ1=1 T
O 3:READ A0:IF SP1=J1 COLOU
R 1:COLOUR 131 ELSE COLOUR
2:COLOUR 128
470 VDU 31,(40-LENA0)/2-1
,10+J1:PRINTA0:NEXT
480 RESTORE 710:FORJ1=1 T
O 2:READ A0:IF GB1=J1 COLOU
R 1:COLOUR 131 ELSE COLOUR
2:COLOUR 128
490 VDU 31,(40-LENA0)/2-1

```

```

,14+J1:PRINTA0:NEXT
500 REPEATUNTILINKEY(-99)
=0
510 *FX15
520 REPEAT:G=GETS:LI=INS
TRI("EAHVSFMB")*80:UNTIL LI
OR G=" " :IF G=" " ENDPROC
C
530 IF IX<5 LDI=X:BOT044
0 ELSE IF IX>4 AND IX<0 SP1
=IX-4:BOT0440 ELSE GB1=IX-7
:BOT0480
540 DEFPROCquestion:IF GB
1=2 BOT0 560
550 RESTORE 730:COLOUR 7:
FOR J1=30 TO 9 STEP -3:READ
A0:VDU 31,0,31:PRINTA0:NEXT
J1
560 MX=RND(40):FOR J1=1 T
O LD1+2:T1=AI(M1,J1):PROCba
r:PROCsound
570 NEXT:ENDPROC
580 DEFPROCbar:IF GB1=2 E
NDPROC ELSE GC0L 0,((J1-1)
MOD 7)+1:MOVE J1+120+120,0:
MOVE J1+120+240,0:PLOT 85,3
1+120+120,T1+96-4:PLOT 85,3
1+120+240,T1+96-4:GC0L 0,0
590 FOR K1=1 TO T1-1:MOVE
J1+120+120,K1+96:DRAW J1+1
20+240,K1+96+4:DRAW J1+120+240,K
1+96+4:NEXT:ENDPROC
600 DEFPROCsound:SOUND 1,
-2,BI(T1),20:TIME=0:REPEAT
UNTILTIME=(3-6P1)*35+10:*FX
21,5
610 ENDPROC
620 DEFPROCdouble(SCF):FO
RJ1=1:TOLENSC=PROCdouble(I
ASC(MID$(SCF,J1,1)):NEXT:
ENDPROC
630 DEFPROCdouble(IPC):I
X=CHX AND Z55:Y1=CHZ/256:AZ
=10+7*CHZ/256:CALL$FFFI:VDU2
3,244,CHX71,CHX71,CHX72,CHX
72,CHX73,CHX73,CHX74,CHX74,
23,245,CHX75,CHX75,CHX76,CH
X76,CHX77,CHX77,CHX78,CHX78
,11,244,18,8,245:ENDPROC
640 DATA "E Easy 2
notes"
650 DATA "A Average 4
notes"
660 DATA "H Hard 6
notes"
670 DATA "V Very hard 8
notes"

```

```

680 DATA "S Slow speed"
690 DATA "M Medium speed"
700 DATA "F Fast speed"
710 DATA "G Graph"
720 DATA "B Blind"
730 DATA doh,ray,me,fah,s
oh,lah,te,doh
740 DATA 101,109,117,121,
129,137,145,149
750 DATA 1,2,3,4,5,6,7,8
760 DATA 8,7,6,5,4,3,2,1
770 DATA 1,2,3,0,8,5,3,1
780 DATA 8,5,3,1,1,3,5,8
790 DATA 2,5,3,6,4,7,5,8
800 DATA 8,7,5,4,6,3,5,2
810 DATA 1,3,3,3,1,5,3,1
820 DATA 8,7,6,6,7,6,7,5
830 DATA 1,2,3,2,3,3,3,1
840 DATA 1,2,3,4,5,4,3,2
850 DATA 1,1,3,3,2,2,5,5
860 DATA 1,2,3,2,3,4,3,5
870 DATA 0,7,6,5,8,7,6,5
880 DATA 1,2,3,4,1,2,3,4
890 DATA 1,3,5,8,1,3,5,8
900 DATA 0,5,3,1,8,5,3,1
910 DATA 1,3,5,8,3,5,8,1
920 DATA 5,5,4,4,3,5,2,5
930 DATA 1,1,5,5,6,6,5,5
940 DATA 4,4,3,3,2,2,1,1
950 DATA 1,3,5,8,7,6,5,5
960 DATA 0,5,3,1,1,2,3,4
970 DATA 7,6,5,7,5,4,3,1
980 DATA 2,3,1,3,4,5,3,5
990 DATA 4,6,5,4,3,1,3,2
1000 DATA 8,7,6,4,3,4,5,5
1010 DATA 1,2,3,4,5,6,3,2
1020 DATA 8,1,8,1,5,3,5,1
1030 DATA 8,1,7,2,6,3,5,4
1040 DATA 4,5,3,6,2,7,1,8
1050 DATA 8,7,4,5,3,2,5,1
1060 DATA 3,6,4,5,8,7,2,3
1070 DATA 5,5,7,6,4,4,3,8
1080 DATA 2,2,3,4,5,5,7,8
1090 DATA 6,6,7,7,1,3,8,2
1100 DATA 4,4,5,3,4,5,6,6
1110 DATA 8,8,2,2,7,3,5,1
1120 DATA 1,1,3,3,3,5,5,8
1130 DATA 8,6,4,2,1,3,5,7
1140 DATA 7,1,5,3,8,4,2,6
1150 REM
1160 REM * Any further
1170 REM * tunes go here

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

# NEWSLETTER

## Hot line for fishermen

ICELANDIC subscriber Ingiber Oskarsson is casting his net wide, hoping to catch MicroLink members and their friends who are involved in fishy business.

Ingiber works in the fish processing industry, based in Keflavik, and wants to contact other system users with connections in the trade.

His company supplies salted fish to customers in

Spain, Portugal and Italy.

This takes care of all the cod that's brought ashore, but it leaves him with plenty of other species on the slab—and he'd like to find markets for them.

Haddock, catfish, halibut—and the exotically-named tusk and redfish—are available, fresh and unsalted, and Ingiber can be contacted on MAG20213.

## Ready for your order

**HUNDREDS** of items of computer hardware, software and peripherals are now within keyboard reach of MicroLink subscribers through OrderLink.

Like a shop that is open 24 hours a day, seven days a week, OrderLink is the con-

venient way to buy products from some of the biggest names in the industry.

And the list is growing as more major suppliers join this increasing popular electronic mail-order database for computer and communications equipment.

## LINK WITH THE ERA OF STEAM

THE British Rail booking service on MicroLink isn't all about high speed Inter City travel. It also caters for those who like to hark back to a more leisurely and stylish era.

Subscribers can turn back the clock by taking their reserved seats on one of a series of steam-hauled excursions running between Marylebone Station and Stratford-upon-Avon on Sundays during the spring and summer months.

These special trains will be pulled by historic steam locomotives such as LNER Pacific locos Flying Scots-

man, Sir Nigel Gresley and Sir Lamiet.

The return fare of £35 per passenger includes First Class reserved seat, morning coffee and three-course roast beef luncheon on the outward journey, and afternoon tea complete with scones and clotted cream on the way back.

All the meals are served at your seat by BR waiters and there's also a fully licensed bar available throughout the day.

MicroLink plans to add more special train excursions to its British Rail booking service in the near future.

**Find out more about what MicroLink offers by sending a stamped addressed envelope to:**  
**Europa House, 68 Chester Road,**  
**Hazel Grove, Stockport SK7 5NY.**

## Satellite covers weather scene

A **DRAMATIC** breakthrough on the computer front now allows MicroLink subscribers to discover what the weather holds in store.

Whether they live in Turkey or Torquay, they can tap into the same information from outer space that enables the men from the Met Office to predict sunshine or showers.

The reason for this is WeatherLink, an exclusive new service on MicroLink.

Using an aerial based in Kent, signals from the

NOAA9 weather satellite are intercepted and converted into electronic data.

The receiver works on circular polarisation to follow NOAA9 every time it appears on the horizon, faithfully monitoring it until it disappears from view some 15 minutes later.

And the same sequence is followed on average four times a day.

Live pictures produced by the satellite hovering 450 miles overhead—it takes two at a time, one in visible light,

the other infra red—clearly show the part of the world from North Africa, through Europe and Great Britain up to Iceland.

All these are recorded on a micro linked to the receiving aerial. The next stage involves a converter which takes the image and readies it for transmission over standard telephone lines to the main MicroLink computer.

Once a MicroLink subscriber logs on, all he needs to do is pull down the

information file in its expanded format, compress it using specially written software which is also on the MicroLink menu, and then display it.

Launched on February 12, WeatherLink generated such excitement that a team from Thames Television was on hand to cover the event.

At exactly 3.05pm, subscriber John Wallbridge achieved a world first by displaying the first weather satellite picture on his micro in his London home.

Here's something **SPECIAL** from



**BARGAIN OFFER!**  
FOUR classic games for only £1.50 each



We've commissioned four rip-roaring games for the Electron and BBC Micro

Three of this high-powered collection are top-rate machine-code versions of arcade classics and the fourth is a thrilling real-time adventure game. There's hours of enjoyment and something to suit everyone in this unique value for money collection

**SNAPMAN** — Guide your man through the maze as he munches energy pellets and avoids hostile aliens

**ALIEN INTRUDERS** — With only your laser for protection you must destroy the waves of aliens who threaten to engulf you

**PANZER ATTACK** — You are a tank commander engaged in vicious combat against encircling enemy forces

**MAYDAY** — A futuristic adventure! As captain of an interstellar cruiser you must guide the sole survivor of a stricken space freighter through the wreckage of his craft. If you fail to recover those vital medical supplies a whole planet is doomed!

Please send \_\_\_\_\_ copy/copies of Classic Arcade Games.

I enclose a cheque/PO No. \_\_\_\_\_ for £ \_\_\_\_\_

made payable to: Database Publications Ltd.

- |  |
|--|
| <input type="checkbox"/> Electron tape £5.95                     |
| <input type="checkbox"/> BBC Micro tape £5.95                    |
| <input type="checkbox"/> BBC Micro disc £7.95                    |
| <small>(Please tick! Europe and overseas add £1 p&amp;p)</small> |

Name \_\_\_\_\_

Address \_\_\_\_\_

Post code \_\_\_\_\_ Tel. No. \_\_\_\_\_

Post to: Classic Arcade Games offer, Electron User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY

EU4



SAVE ££££££££££££££££

**ORDER NOW  
WHILE STOCKS LAST**

**FREE**

WITH VIEW  
**£29.95**  
OR VIEW SHEET  
**£29.95**

**PLUS** **ELECTRON  
ADVANCED USER  
GUIDE WORTH  
£9.95**

**BUSINESS  
PACK WORTH  
£34.95**

(See opposite  
page for  
further details)

(The definitive  
handbook for  
serious users)

**CARTRIDGES**

Master  
Compatible

	R.R.P.	NOW
LOGO	£59.95	£39.95
ISO-PASCAL	£59.95	£39.95
LISP	£29.95	£9.95

**CASSETTES**

Master and  
BBC Micro  
Compatible

FORTH	<b>ONLY</b> <b>£6.95</b> each
LISP	
TURTLE GRAPHICS	
S PASCAL	
<b>ORDER ANY 2 FOR ONLY £10</b>	

Name \_\_\_\_\_

Address \_\_\_\_\_

**PLEASE SUPPLY**

- |                      |         |
|----------------------|---------|
| 1. _____             | £ _____ |
| 2. _____             | £ _____ |
| 3. _____             | £ _____ |
| 4. _____             | £ _____ |
| 5. _____             | £ _____ |
| Post & Packing _____ | £ _____ |

**0.95**

TOTAL £ \_\_\_\_\_

CHEQUES PAYABLE TO MICRO  
POWER. GOODS DESPATCHED  
WITHIN 48 HRS. PRICES INCLUDE  
V.A.T. ACCESS/VISA. SEND YOUR  
ORDER TO: MICRO POWER LTD.,  
NORTHWOOD HOUSE, NORTH  
STREET, LEEDS LS7 2AA.  
DEALERS ENQUIRIES WELCOME  
TEL: 0532 458800/434006

Micro Power Limited, Northwood House, North Street, Leeds LS7 2AA

**M I C R O P O W E R**

# ACORNSOFT BONANZA

# AMAZING OFFERS

## GAMES PACK 1

	R.R.P.
Chess	£6.99
Snapper	£6.99
Free Fall	£6.99
Philosophers Quest	£6.99
Crazy Tracer	£6.99
	<b>£34.95</b>

## GAMES PACK 2

	R.R.P.
Draughts & Reversi	£6.99
Monsters	£6.99
Starship Command	£6.99
Castle of Riddles	£6.99
Fire Bug	£6.99
	<b>£34.95</b>

## GAMES PACK 3

	R.R.P.
Boxer	£6.99
Arcadians	£6.99
Planetoid	£6.99
Sphinx	£6.99
Maze	£6.99
	<b>£34.95</b>

• ANY GAMES PACK ONLY **£8.95**

## HOME INTEREST PACK

	R.R.P.
Talk Back	£6.99
Work Shop	£6.99
Tree of Knowledge	£6.99
Peeko Computer	£6.99
Paul Daniel's Magic Show	£6.99
	<b>£34.95</b>

## BUSINESS PACK

	R.R.P.
Desk Diary	£6.99
Personal Money Management	£6.99
Business Games	£6.99
Graphs & Charts	£6.99
Creative Graphics	£6.99
	<b>£34.95</b>

## PRIMARY EDUCATION PACK

	R.R.P.
Sentence Sequencing	£6.99
Word Sequencing	£6.99
Word Hunt	£6.99
Missing Signs	£6.99
Number Balance	£6.99
	<b>£34.95</b>

• ANY PACK ONLY **£8.95**

## IVAN BERG SOFTWARE

	R.R.P.	NOW
Theatre Quiz	£12.95	£4.95
Crime and Detection Quiz	£12.95	£4.95
Music Quiz	£12.95	£4.95
History Quiz	£12.95	£4.95
Science Fiction Quiz	£12.65	£4.95
Royal Quiz	£12.65	£4.95
I Do	£12.65	£4.95
The Dating Game	£12.65	£4.95

## EDUCATION OFFERS

	R.R.P.	NOW		R.R.P.	NOW
Linkword French	£14.95	£4.95	Maths 'O' Level I	£12.65	£4.95
Linkword German	£14.95	£4.95	Maths 'O' Level II	£12.65	£4.95
Linkword Spanish	£14.95	£4.95	Biology	£12.65	£4.95
Linkword Italian	£14.95	£4.95	English	£12.65	£4.95

Elite ~~£12.95~~ **£11.95**  
 Plus Three Games Disk ~~£19.95~~ **£18.95**  
 Magic Mushrooms ~~£11.95~~ **£10.95**  
 Me and My Micro Book + Cassette ~~£12.95~~ **£4.95**  
 Plus One Games Cartridges ~~£14.95~~ **£4.95**  
 STARSHIP COMMAND... SNAPPER...  
 COUNTDOWN TO DOOM... HOPPER

Name \_\_\_\_\_ Address \_\_\_\_\_

### PLEASE SUPPLY

- \_\_\_\_\_ £ \_\_\_\_\_
  - \_\_\_\_\_ £ \_\_\_\_\_
  - \_\_\_\_\_ £ \_\_\_\_\_
  - \_\_\_\_\_ £ \_\_\_\_\_
  - \_\_\_\_\_ £ \_\_\_\_\_
- Post & Packing \_\_\_\_\_ £ **0.95**

TOTAL £ \_\_\_\_\_

Micro Power Limited, Northwood House, North Street, Leeds LS7 2AA

# MICROPOWER

CHEQUES PAYABLE TO MICRO  
 POWER. GOODS DESPATCHED  
 WITHIN 48 HRS. PRICES INCLUDE  
 V.A.T. ACCESS/VISA. SEND YOUR  
 ORDER TO: MICRO POWER LTD.,  
 NORTHWOOD HOUSE, NORTH  
 STREET, LEEDS LS7 2AA.  
 DEALERS ENQUIRIES WELCOME  
 TEL: 0532 458800/434006

OVER the next few months I'll be investigating those special calls named Osword that are available to Electron users. I'll present a short program or procedure to go with each.

But before we start finger tapping, we'll take a general look at what they can do.

Some of you will have read up on FX calls in past issues of *Electron User*. Their other name is Osbyte – they are the operating system calls which enable us to affect the way our Electrons behave.

An example of an Osbyte call is \*FX137,1,0 which is used to turn on the cassette player relay.

Osbyte calls use only three parameters. In this case A=137, X=1 and Y=0.

Instead of the \*FX command we could assign the

three values to A%, X% and Y% respectively and then call &FFF4.

Osbytes are limited because only three parameters can be passed to them. Suppose we want to pass more data with our calls. That's where Oswords come

into play!

Oswords are operating system calls that can deal with many bytes of data, in some cases up to 15 bytes or units of information.

Let's see what Oswords can do. Table 1 lists the 14 calls available to you and each will be dealt with in this series of articles.

I've indicated if there's an equivalent instruction in Basic, and for reference I've stated the number of bytes that have to be given to the call for it to operate, and the number of bytes the call returns.

You might ask: "If there's a Basic instruction that will do the same as an Osword call then why worry about Osword?" The main reason is that these calls are very easy to use in machine code programs.

Some Basic instructions, like POINT and INPUT, are not available directly in assembly language, but the equivalent Osword calls are simple to apply.

Some of the program examples I'll use will be pure machine code work. So I'll endeavour to make them straightforward.

If you've not tried machine code programming before I'm sure you'll find them helpful.

The calls that haven't an equivalent Basic command will be called from a Basic program.

As I mentioned earlier, Osword calls are very similar to the Osbyte (FX) calls that are available to Basic programmers.

The name suggests that Oswords can send, or read,

more data than Osbyte calls. That's the reason they're more difficult to master.

With an FX call only the values passed in A, X and Y are used to determine the action of the routine invoked.

With Oswords the values in X and Y point to a location in the memory which contains the values to be used.

X holds the low and Y the high byte of the address. That location, which is called a parameter block, may contain 1 or up to 14 bytes of data, according to the number of the call being made.

One difficulty lies in how to make sure that the correct data is placed in the correct location.

When the call is made the location specified by X and Y is also used to store any information returned by the routine. A further process must be undertaken to retrieve the data from that location.

Making the Osword call is similar to making an Osbyte call. The necessary values are placed in A%, X% and Y%, then CALL &FFF1 is used.

There isn't the equivalent of Osbyte's \*FX command. It's not usually necessary to determine the values of A%, X% Y% and the register after the call has been made, therefore OSR(&FFF1) is not used.

A typical call from Basic could look like this:

```
A1=1:IX=400:YI=409:CALL
&FFF1
```

That particular line would generate Osword call 1, which reads the internal time-elapsed clock. The parameter block would be placed at

# OSWORD

JOHN WOOLLARD begins his series

by looking at what these machine

code calls can do for you

Call	Bytes sent	Bytes back	Basic	Action
A=0	5	0	INPUT	Reads a line of data from keyboard.
A=1	0	6	TIME	Reads system elapsed-time clock.
A=2	6	0	TIME	Writes system elapsed-time clock.
A=3	0	6		Reads interval timer.
A=4	6	0		Writes interval timer.
A=5	4	1		Reads a byte from I/O processor memory.
A=6	5	0		Writes a byte to I/O processor memory.
A=7	8	0	SOUND	Performs a sound command.
A=8	14	0	ENVELOPE	Defines an envelope for use with a sound command.
A=9	4	1	POINT	Reads a pixel value and returns the logical colour number at a particular screen position.
A=&A	1	8		Reads the dot pattern of a specified displayable character.
A=&B	1	2		Reads the palette for a given logical colour.
A=&C	5	0	VDU19	Writes the palette value for a given logical colour.
A=&D	0	8		Reads the current and previous graphics cursor position.

Table 1: Summary of the Osword calls.



location &900 onward (that's where the YX points to).

Enough of the theory, let's get going with Program I. This makes a single Oword call with the accumulator equal to 10, that's the call which reads character definitions.

Line 20 sets the value of the variable *osword%* to &FFF1, the location to which an Oword call is made.

Line 30 sets the variable *block%* to be &900, the location of the start of the parameter block.

The X and Y registers are set to point to this. X% takes the least significant byte, using the MOD operator, and Y% to the most significant value using the DIV operator.

In this particular case X% will equal zero and Y% will equal 9. Line 40 places 65, the Ascii value of the character A, at the start of the block.

Looking at Table I you will see that this particular call requires one byte of data but will return eight bytes. Lines 90 onwards print out the values placed in the parameter block after the call has been made.

Figure 1 shows how those numbers are interpreted as the dot matrix of the letter A.

In Program I I've used the location &900 to store information.

If you don't want to use that particular location you may choose others.

One alternative is to dimension an array, say *block%*, using:

```
DIM block% 15
```

on a line near the start of your program. This instruction reserves a 16 byte area of memory, (*block%+0*, *block%+1*, ... *block%+15*).

When the Oword call is made, X and Y must point to the start of that allocated space. However *block%* is determined, it is usual to use the instructions:

```
X% = block% MOD 256
Y% = block% DIV 256
```

```
10 REM PROGRAM I
20 osword% = &FFF1
30 block% = &900
40 ?block% = ASC("A")
50 AI = 10
60 X% = block% MOD 256
70 Y% = block% DIV 256
80 CALL osword%
90 FOR k% = &900 TO &908
100 PRINT ?k%
110 NEXT
120 END
```

Program I

before calling Oword with CALL &FFF1.

Now let's move on to some practical applications. This month all the demonstrations use Oword 10, the call that reads the character definition bytes.

Page 93 of the User Guide gives an explanation of how the character definition is made up of eight bytes of data.

Program II enables double height characters to be written in all the graphics modes.

The procedure first reads the character definition, and enlarges and prints the top half

of the character. It then enlarges the lower half and prints it on the line below. An explanation of its working is made in the July 1984 *Electron User*.

Program III creates extra large characters on the screen. The 8x8 dot matrix of the

```
10 REM PROGRAM II
20 MODE 1
30 PROCdblp(3,3,"Electro
n User")
40 END
50 DEFPROCdblp(htab%,vtab%,str%)
60 LOCAL pos%,vpos%,k%
70 vpos% = VPOS : pos% = POS
80 FOR k% = 1 TO LEN(str%)
90 ?k% = ASC(MID$(str%,k%
))
100 AI = 10
110 X% = 470
120 Y% = 0
130 CALL &FFF1
140 VDU 23,255,?k%,?k%,
?k%,?k%,?k%,?k%,?k%,?k%,
?k%,?k%
150 PRINT TAB(htab%+k%,vt
ab%);CHR$(255)
160 VDU 23,255,?k%,?k%,
?k%,?k%,?k%,?k%,?k%,?k%,
?k%,?k%
170 PRINT TAB(htab%+k%,vt
ab%+1);CHR$(255)
180 NEXT
190 PRINT TAB(pos%,vpos%)
;
200 ENDPROC
```

Program II

Ascii value = 65	Character = A							
&900 = 65	A% = 10 X% = 0 Y% = 9							
	128	64	32	16	8	4	2	1
&901 = 60								
&902 = 102								
&903 = 102								
&904 = 126								
&905 = 102								
&906 = 102								
&907 = 102								
&908 = 0								

Figure 1: How character A is built up

```
10 REM PROGRAM III
20 MODE 4
30 REPEAT
40 PROC1qmp(0,0,GET,1)
50 UNTIL FALSE
60 END
70 DEFPROC1qmp(htab%,vtab%,chr%,size%)
80 LOCAL pos%,vpos%,acro
ss%,down%,mag1%,mag2%
90 vpos% = VPOS : pos% = POS
100 VDU 23,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255,255
110 ?k% = chr%
120 AI = 10
130 X% = 470
140 Y% = 0
150 CALL &FFF1
160 FOR down% = 0 TO 7
170 FOR mag1% = 1 TO size%
180 PRINT TAB(htab%+vtab%
+size%*down%+mag1%);
190 FOR across% = 7 TO 0 ST
EP-1
200 FOR mag2% = 1 TO size%
210 IF 2*across% AND ?k%
!+down% THEN VDU 255 ELSE
VDU 32
220 NEXT
230 NEXT
240 NEXT
250 NEXT
260 PRINT TAB(pos%,vpos%)
;
270 ENDPROC
```

Program III

## From Page 45

character is enlarged to the size of an 8x8 character block on the screen. The procedure can be used in all graphic modes.

Again, there's a detailed explanation in the August 1984 *Electron User*.

Program IV uses the same Osword call to create italic style script in any mode. The lower half of the 8x8 matrix is displaced to the left before the character is printed.

In these three programs the parameter block has been placed in location &70 onwards. This particular area of zero page memory is reserved for your programs.

In each case the call is made by placing the Ascii value of the character to be printed in location &70, setting X% and Y% up to point to &70, setting A% to 10 and

```
10 REM PROGRAM IV
50 CLS
60 PROCitalic(5,10,"Electron User")
70 PRINTTAB(5,11),"Electron User"
80 END
90 DEFPROCitalic(htabZ,vtabZ,ustr$)
100 LOCAL posX,vposX,kX

110 vposX:=VPOS : posX:=POS
120 PRINT TAB(htabZ,vtabZ);
130 FOR kX=1 TO LEN(ustr$)
140 %70=ASC(MID$(ustr$,kX))
150 AX=10
160 YX=470
170 YX=0
180 CALL &FFF1

190 VDU 23,255,%70,1,%72,%73,%74,%75*2,%76*2,%77*2,%78*2
200 VDU 255
210 NEXT
220 PRINT TAB(posX,vposX);
230 ENDPROC
```

Program IV

making the call with CALL &FFF1.

The procedures created in each program are designed to be incorporated into your own listings.

So that they will not corrupt values of variables that you may be using, all variables used by the procedures are made local.

Further, the text cursor is

always returned to the position it was at immediately before the call was made.

All three procedures use the VDU23 statement to redefine character number 255.

If that character is being used elsewhere in your program another character should be used by the procedures.

After entering the programs you may then like to try

creating a procedure that combines the first and third techniques to create double height italic script.

● Next time we'll be looking at Oswords and their use in machine code. We'll develop programs that use the sound and envelope facilities, then you'll be able to include music and sound effects in your machine code games.

## Frak!

'It's something special'

R.R.P. £7.90



It's arrived for the Electron —  
at better Dealers now.

Aardvark Software, 100 Andleigh  
Green Road, Horsham, Essex RM11 2LG

## MITHRAS Software

ADD THESE FAMOUS GAMES TO YOUR  
COLLECTION AT BARGAIN PRICES

**U.S. Gold**  
**BEACH-HEAD £4.95**  
**Atarisoft**  
**ROBOTRON\* £4.95**  
**A & F**  
**CHUCKIE EGG £3.95**  
**CYLON ATTACK £3.95**  
**Longman Software**  
**FIRST MOVES\* £3.95**  
(Chess for beginners)

**ADVENTURES**  
**Shards**  
**PETTIGREW'S DIARY £3.95**  
**Interceptor**  
**TALES OF ARABIAN NIGHTS £3.50**  
**Adventure International**  
**GREMLINS £3.95**  
**Adventure and War Games**  
**Presentation Pack\***  
**Lottorion: Battlezone 2000: Paras;**  
**Johnny Reb: Roman Empire; Solon**  
**Lamp;**  
**Sherids: Empire**  
**6 TOP GAMES ON ONE TAPE FOR**  
**£7.70**

### MICROPOWER

Adventure - Bumble Bee - Chess - Croaker - Cybertron Mission -  
Danger UXB - Electron Invaders - Escape from Moonbase Alpha -  
Felix Meets the Evil Weevils - Felix in the Factory - Felix and  
the Fruit Monsters - Frenzy - Gauntlet - Galactic Commander -  
Ghouls - Jet Power Jack - Killer Gorilla - The Mine - Moonraider -  
Position - Rubble Trouble - Stock Car - Swag

Any 1 for £3.25      2 for £6.25  
3 for £9              4 for £11.50  
5 for £13.75        6 for £15.75

Please give alternative titles if possible.

Orders will normally be despatched by First Class Post within 7 days of receipt of order.

**ALL PRICES INCLUDE POSTAGE AND PACKING IN U.K.**  
(Overseas prices on application)

\* Titles also for BBC

Send cheque or PO payable to:

**MITHRAS SOFTWARE (EU2)**  
**PO Box 151, Maulden, Bedford MK45 2YH**

( PLEASE NOTE )  
( NEW PREMISES )

## 21st. Software (BBC VERSIONS AVAILABLE)

**PRESENTS A SELECTION OF HARDWARE, UTILITIES & SOFTWARE FOR THE ELECTRON**

PLAY GAMES AT  
YOUR OWN SPEED  
OR FREEZE FRAME  
WITH "SLOMO"  
R.R.P. £14.95 OUR PRICE £12.45  
Fully compatible with the Plus 1

The Microprocessor  
POWER PACK!  
3 Cassette  
FRENZY  
THE MINE  
CHOKER

**MACSEN'S  
BULLSEYE**  
RRP \$9.95 OUR PRICE \$7.95

NUTS TO ACORN (SUGGESTED PRICES)	
BOXER	£1.99
STARSHIP COMMAND	£2.99
BUSINESS GAMES	£2.99
DESK DIARY	£2.99

MELBOURNE HOUSE'S  
WAY OF EXPLODING FISH  
R.P. \$9.95 OUR PRICE \$8.95

**SUPERIOR SOFTWARE'S  
SMASH PACK  
3 CASSETTES**  
Crushing 150mph the Cornpiled  
every Penguin (Crush the Super  
any Jet. (Crush the ring layers  
out for the snappers!  
Fantastic value  
All 3 for just £7.95!

**SLOGGER SOFTWARE ROMS**  
**ARMAN R/P £17.50 OUR PRICE £15.75**  
**CLARMON (machine code monitor)**  
**R/P £22.50 OUR PRICE £20.25**  
**12P3 Tape to Disc R/P £10.95**  
**OUR PRICE £10.65**

STARWORD 16K ROM  
R.R.P £34.50 OUR PRICE £31.75  
STARGRAPH GRAPHICS ROM  
R.R.P £21.95 OUR PRICE £19.99  
TP2CU  
(Tape Is Common)  
R.R.P £18.95 OUR PRICE 18.65

**YORKSHIRE TV's  
ME AND MY MICRO**  
Cass and Book  
(of the Series)  
**ONLY £2.50**

**FIRST BYTE JOYSTICK INTERFACE**  
Includes conversion tape \$19.94  
+ Duckshot II Joystick \$12.00  
**TOTAL \$32.94 OUR PRICE \$23.00**

Includes commission 18p  
R.R.P. £10.95 OUR PRICE £10.29

**TYNESOFT'S  
WINTER OLYMPICS**  
R.R.P £7.95 OUR PRICE £6.95  
**MOUSETRAP**  
R.R.P £6.95 OUR PRICE £6.95

**VINE MICROS ADDCOM**  
R.P. £28.00  
OUR PRICE £26.00

RUMICO'S  
RICK HANSON  
RHP CO. 68 DUE PRICE CASH

**SLOGGER ROMBOXES**  
**ROMBOX RRP £44.95 OUR PRICE £41.95**  
**ROMBOX - P**  
 Gift in Cartridges: Prince's Interlace + Free  
 ROM RRP £89.95 OUR PRICE £84.95

NEWSON'S  
SOUTHERN BELLE  
\$25.00 - \$35.00 - \$45.00 - \$55.00

**SUPERIOR SOFTWARE'S  
KARATE COMBAT**  
R.R.P. £8.95 OUR PRICE £2.95

**PLUS 3 OWNERS**  
**BLUE RIBBONS ELECTRON GAMES**  
Games: Nightmare Mara, Castle Assault,  
Diamond Mine, Astru Plumber,  
Diamond Mine II  
R.R.P. £8.95 OUR PRICE £9.95

	R.R.P.	Price
<b>AARDVARK</b>		
File	7.90	6.95
<b>A.C. PRODUCTS</b>		
Advanced Eric Textile Rom	26.50	32.00
<b>ACORN</b>		
Ernie in Black	12.95	10.95
Music Melancholy	11.35	10.00
Snapdrag	8.99	8.99
Sphinx Adventure	9.99	9.95
Dragons and Revers	9.99	9.95
Arctania	9.99	9.95
Free Fall	8.99	8.95
Metatars	9.99	9.95
Phosphorus	9.99	9.95
Phosphorus	9.99	9.95
Snapdrag	9.99	9.95
Monsters	9.99	9.95
Hoppy	9.99	9.95
Chess	8.99	8.95
Fimbrog	9.99	9.95
Forti	16.85	15.95
Personal Money Management	9.99	9.95
Tree of Knowledge	8.99	8.95
View Rom Cartridge	29.99	29.95
Warrior	14.95	14.95
Hoppy ROM (Cart)	14.95	14.95
View Rom ROM (Cart)	14.95	14.95
SD ROM ROM (Cart)	59.90	59.90
<b>ACORN/INTEL</b>		
Phosphorus	8.99	7.95
Timeman Day	8.95	7.95
Happy Numbers	8.95	7.95
Wordplay	8.95	7.95
Deputy	8.95	7.95
<b>ACORN/LINKWORD</b>		
German	14.95	12.95
French	14.95	12.95
Italian	14.95	12.95
Spanish	14.95	12.95
<b>ADDICTIVE GAMES</b>		
Football Manager	8.99	7.95
Bellini	9.95	8.95
<b>ADVENTURE INT.</b>		
Promising	7.95	6.95
The Walk	7.95	6.95
Splendour	7.95	6.95
Adventureland	7.95	6.95
The Giant	7.95	6.95
Mystery Treasure	7.95	6.95
Secret of Shmoo	7.95	6.95
Pyramid of Doom	7.95	6.95
Strategic Adventure	7.95	6.95
Private Adventure	7.95	6.95
<b>ALLIGATOR</b>		
Reagan	7.95	6.95
Reagan	7.95	6.95
Contract Bridge	8.95	8.95
Guardians	7.95	6.95
Tarzan Boy	7.95	6.95
Warrior	7.95	6.95

[illegible]

	R.R.P.	OUR PRICE
<b>IMAGINE</b>		
Two of King Fu	0.95	7.95
<b>INCENTIVE</b>		
Confusion	0.95	5.95
<b>INTERCEPTOR</b>		
Takes Action! Knight	0.00	5.00
<b>KANSAS CITY</b>		
Ring of Fate	7.95	8.50
Music Begins	0.95	5.50
<b>KIDNAP SOFTWARE</b>		
French Mistresses A to B	0.95	7.95
German Women A to B	0.95	7.95
Spanish Tunes A to B	0.95	7.95
Armeny Bait A to B	0.95	7.95
Armeny Bait Sport	0.95	8.95
Identify Europe	7.95	8.95
<b>K.I.</b>		
Micro Math (24 pages) 10 Level	24.50	21.50
Micro English (24 pages) 10 Level	24.50	21.50
Micro Math's (A Level)	24.50	21.50
<b>LINDSEY'S SOFTWARE</b>		
Two Menus (Chess 4-1)	0.95	8.95
Master May Typing Tutor	0.95	8.95
<b>MACEIN SIFT</b>		
Black Dusters	7.95	8.95
Gold Reef	0.95	8.95
<b>MELBOURNE HOUSE</b>		
Gynopology	0.95	7.95
Classic Automobile	0.95	5.95
Hungry Heart	0.95	8.95
Terminology	0.95	5.95
<b>M.C. LOTHRIEN</b>		
Pelvic	0.95	5.95
Parmi	0.95	5.95
Johnny Red	0.95	5.95
Special Operations	0.95	5.95
Two Menus (Chess 4-1)	0.95	8.95
Bathrooms	0.95	5.95
<b>MICROBYTE</b>		
Midson Raiders	0.95	5.95
2nd	0.95	5.95
Reversi	0.95	3.95
Prinfil	4.95	3.95
<b>MICROIDEAL</b>		
Super Shetline	0.00	7.00
<b>MP SOFTWARE</b>		
Salon Castle	7.50	8.50
Victory of the Kings	7.50	8.50
Victory of the Kings	7.50	8.50
Woodland Terror	7.50	8.50
Blue Dragon	7.50	8.50
Sorcerer	7.50	8.50
<b>MICROPOWER</b>		
Shields	7.95	8.95
Jeff Power Jack	0.95	5.95
Peacocks	0.95	5.95
Swag	0.95	5.95
Shanitar	0.95	5.95
Greath	7.95	8.95
Great	7.95	8.95
Manmade	7.95	8.95
<b>X.I.B.</b>	7.95	8.95

	R.R.P.	OUR PRICE
FelafelT Wazools	7.95	5.95
Flame	7.95	4.95
Fly-Trap Monsters	7.95	5.95
Galactic Commander	7.95	6.95
Cybertron	7.95	6.95
Shack Cat	5.95	5.95
Whisker Bats	8.95	5.95
Whirl Tumble	6.95	5.95
Adventure	7.95	6.95
<b>HORROR/DRAFT</b>		
Harmful Strika Force	8.95	6.95
Count with Obede	7.95	6.95
Lock Strang	7.95	8.95
Dark Day	7.95	7.95
Here There with Mr. Men	7.95	5.95
Quick Thinking -	8.95	5.95
Word Games	8.95	6.95
Abominations	7.95	6.95
Stemspeak	8.95	8.95
Castle Tower	8.95	6.95
<b>BASIS</b>		
Acad High	14.95	12.95
<b>SALAMANDER</b>		
737 Flight Sim	8.95	8.95
<b>SHARDS</b>		
Participative Story	7.95	8.95
Mystery of Jeeves Dies	7.95	6.95
Woodbury End	8.95	8.95
Whodunnit	8.95	5.95
<b>SOFTWARE INVASION</b>		
ED Bomb Alley	7.95	8.95
Bureaucracy	7.95	6.95
Brickwork	7.95	6.95
Brain Power	7.95	6.95
Vortex	7.95	8.95
Chapman	7.95	6.95
Stairway to Hell	12.95	11.95
<b>CLONING</b>		
Douglight (2 player physics) Key-ops	7.50	3.50
<b>SHIRRELSOFT</b>		
Supergirl	7.95	6.95
Trabular	8.00	7.00
Pink Paralle	7.95	6.95
<b>SUPERIOR SOFTWARE</b>		
Mr. Mic	7.95	6.95
Smash and Grab	7.95	6.95
Ondrivers	7.95	6.95
Tempest	7.95	6.95
Stargate	7.95	6.95
Death Stars	9.95	8.95
Rayman 2	8.95	8.95
Clairant	9.95	8.95
<b>TYNOSOFT</b>		
Am-Stram-Tam	7.95	6.95
Pig Attack	4.95	3.95
Supergang (Abz)	7.95	6.95
U.S. GOLF		
Heath Hand	8.95	7.95
<b>VISIONS/CSM</b>		
Snooper	6.95	7.95
Strawberry Demons	7.95	6.95
Tron	7.95	6.95

BOX OF 10 C15 COMPUTER CASSETTES £4.50 inc. VAT & P&P.

We guarantee all titles are originals. We offer a quick and reliable service. Most Electron and BBC titles are available on request with the guarantee of at least £1.00 off the R.P.

ALL PRICES ARE INCLUSIVE OF VAT AND CARRIAGE

OVERSEAS ORDERS PLEASE ADD £1.00 THEN 50p FOR 2ND and 3RD ITEMS EACH

Please send me

Cost

Please make cheques payable to:  
**21st Software**

Send orders to:

Address

**21st SOFTWARE**  
15 Bridgefield Avenue  
Wilmslow SK9 5JS  
Tel: Wilmslow (0625) 528885

Post Code  
Tel. No. ....

TOTAL C



# MATHS WORKOUT

**MIKE BIBBY continues his series on how your Electron works**

## The masked bytes are taking control

**LAST month we learned a lot about the binary system – the numbers our micro works in.**

We saw that its memory is divided up into bytes – a set of eight two-state, binary units called bits. Each bit can have the value 1 or 0.

If a bit has the value 1 we say it is set, if a bit has the value 0 we say it is clear.

As we're dealing with eight bits at a time, we can use various combinations of the bits in a byte to code any whole number (integer) in the range 0 to 255.

To do this we associate a code number with each bit. Figure 1 shows the scheme.

Our eight bits are labelled b7 . . . b0 and the numbers associated with each number are shown above each bit (the more mathematical among you will see that they're in ascending powers of two).

To discover the value coded in a byte we simply add the numbers associated with every bit that is set (1), ignoring all clear bits (0). So:

**%10101000**

codes the number:

$$128 + 32 + 8 = 168$$

We also learned to do tricks with, or to put it more properly, manipulate, binary numbers. We could create the comple-

ment of a number – a sort of binary opposite – by changing every clear bit to set ("setting" the bit) and changing every set bit to clear ("clearing" the bit).

So the complement of the above number:

**%10101000**

gives us:

**%01010111**

We can add and subtract binary numbers, as well as multiply and divide. We learned other ways of combining them too, with the logical operators AND, OR, EOR.

When combining two binary numbers under the influence of these operators we compare each bit in one number with the corresponding bit of the other.

Then, according to a rule which depends on the operator we're using, we decide whether that particular bit (the result bit) in the "answer" byte is set or clear. Table 1 shows the rules for the operators.

As we've said, a micro's memory is divided into byte-sized compartments, called memory locations. Each location has a number associated with it so we know which one we're talking about.

These numbers are known as memory addresses.

Much of what a micro-

processor does involves moving information – in the form of binary numbers – from one location to another.

If you cast your mind back to earlier articles, I said that each bit was like a switch – its two values 1 and 0 could be used to signify that the switch was on or off respectively.

Imagine that we could wire up one of our bits to a machine's on/off switch. Then by setting that bit we could switch the machine on, and by clearing it we could switch it off.

This sort of thing is possible, though we'd need to use some clever electronics.

In fact, since we deal with eight bits at a time, we could arrange things so that a single byte controlled the on/off status of eight separate machines – each machine m7, m6 . . . m0 corresponding to an individual bit of that byte, b7, b6 . . . b0. We'll term that byte the control byte.

We call such arrangements memory-mapped output, since what we put in memory maps, or sets the pattern for, what happens in the outside world.

Most microprocessors support this or some similar sort of output. Figure 11 shows the type of scheme we mean.

Assuming we've got things connected up properly, if we

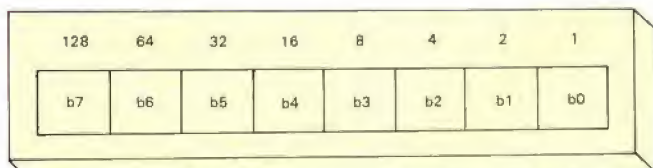


Figure 1: Values associated with bit positions

**AND** Sets the result bit only if both bits compared are set. Otherwise the result bit is clear.

**OR** Sets the result bit if either or both the bits compared are set. Only if both bits compared are clear is the result bit clear.

**EOR** Sets the result bit if the bits being compared differ in value. If the EOR bits compared are identical, the result bit is cleared.

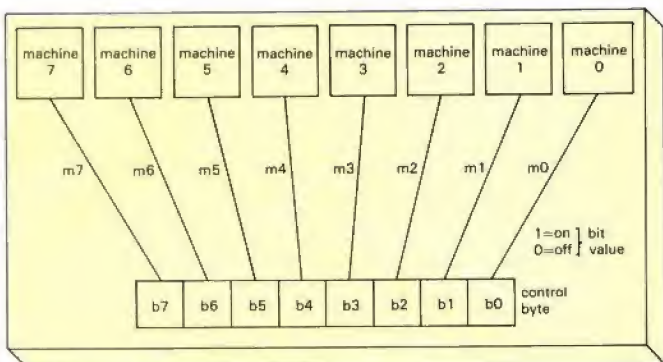


Table 1: Rules for logical operators

Figure 11: Memory mapped control

then load the control byte with:

**%11111111**

all the machines would be on. Remember that if a bit is set the corresponding machine is on. If we want to switch all the machines off, we can load the control byte with:

**%00000000**

And, of course, we can have any on/off pattern of machines, setting or clearing the relevant bits by loading the control byte with new numbers. Loading it with:

**%11100000**

is one way of switching off half the machines.

Sometimes, though, we might want to switch a particular machine or two on or off without knowing (or caring) whether the others are on or off.

This means we need some way of affecting only the bits controlling those machines, while leaving the others unchanged.

Suppose we wanted to switch off a machine – say m6. We can do this by making b6 of the control byte zero.

To clear that one bit to zero we AND the control byte with another byte – called the mask – the bits of which are set (1) except for b6, which will be 0. That is, we AND the control byte with:

**%10111111**

When we make this result our new control byte, and off the machine goes.

To see how it works in practice, let's assume that initially all the machines are on, so the control byte is:

**%11111111**

To switch machine m6 off we must AND it with:

**%10111111**

The sum is:

<b>%11111111</b>	<b>control</b>
<b>AND %10111111</b>	<b>mask</b>
<b>%10111111</b>	<b>new control</b>
	<b>byte</b>

As you can see, the outcome is that when we update the control byte with the result, m6 is switched off while the others remain on.

The trick isn't hard to see. Let's consider things from the point of view of bits in the mask.

If the bit is a 1, when you AND it with the relevant control bit the resulting bit is the same as the control bit. That is, ANDing a bit with 1 leaves that bit unchanged.

Think about it. If the control bit were 1, then as 1 AND 1 = 1, you're left with 1. The bit's unchanged.

If, on the other hand, the control bit were 0 then, as 0 AND 1 = 0, the bit remains unchanged as 0.

In other words bits in the mask with 1 in them leave the corresponding control bit unchanged.

So for machines whose

on/off status we don't want to alter – we may not even know if they're on or off – we set the corresponding bit in the mask to 1.

However if the bit in the mask were clear (0) it wouldn't matter what the state of the original control bit was – the result would still be 0.

Say the control bit was 1, then as 1 AND 0 = 0 the resulting bit is a 0.

Alternatively, if it were 0, since 0 AND 0 = 0 the resulting bit is again 0.

So bits in the mask with 0 in them set the corresponding bits in the result byte to 0.

This means to switch specific machines off we construct a mask consisting of 1s for the machines we wish to leave unchanged and 0s for the machines we want off – in the appropriate bit positions.

We then AND the mask with the control byte and then make the resulting byte the new control byte.

Fine, but how do we switch on specific machines?

Well, we update the control byte by ORing it with another mask.

This time we put 1 in the bits corresponding to the machine we want on, and 0 in the bits corresponding to the machines whose on/off status we wish to leave unchanged.

This works, since when you OR a bit (whether 0 or 1) with another bit whose value is 1, the answer is 1. That is **0 OR 1 = 1** and **1 OR 1 = 1**.

So using a 1 in the relevant bit of an OR mask will set the corresponding result bit. When

this becomes the new control byte the corresponding machine will be turned on or left on.

On the other hand, ORing a bit in the control byte (no matter what value) with 0 leaves that bit totally unchanged since **1 OR 0 = 1** and **0 OR 0 = 0**.

So when we OR the bits of the mask that are 0 leave the corresponding bits of the control byte unchanged.

This means, to switch specific machines on we use a mask consisting of 0s for the machines we wish to leave unchanged, and 1s for the machines we want on – in the appropriate bit positions.

We then OR that mask with the control byte and make the resulting byte the new control byte.

Hence, to ensure that m6 is definitely on, we OR the control byte with:

**%01000000**

For example, if m6 is off, and all the rest on, to switch m6 on we do the following:

<b>%10111111</b>	<b>control</b>
<b>AND %01000000</b>	<b>mask</b>
<b>%11111111</b>	<b>new control</b>
	<b>byte</b>

Of course, both AND and OR have uses for the micro enthusiast other than controlling machines.

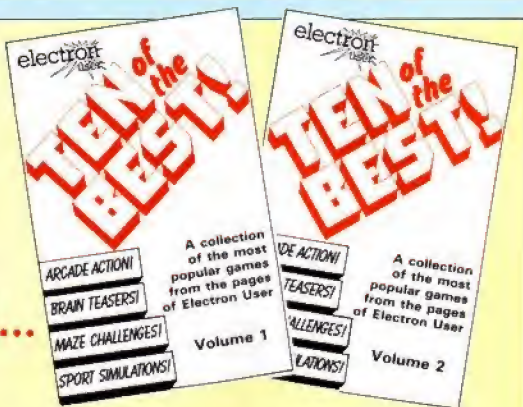
● Next month we'll have a look at some, as well as uses of Exclusive OR.



**WORN OUT** with  
wordprocessing?  
**DEPRESSED** with  
databases?  
**OPPRESSED** with  
machine code?

**Then you need...**

(It's the perfect antidote to  
microcomputer malaise!)



#### **Volume 1 contains:**

##### **Jam Butty**

Machine code simulation of high drama on a building site

##### **Golf**

Play a round by yourself, or play against your pals

##### **Haunted House**

Fight against all the odds to get out alive

##### **Space Hike**

Another classic. Help the spacemen avoid mauling monsters

##### **Parky's Peril**

Help Parky through an invisible maze, racing against time

##### **Rally Driver**

All the thrills of high-speed driving, with none of the risks

##### **Alphaswap**

Your letters are in a twist. Can you put them in order?

##### **Knockout**

Fast and furious action as you batter down a brick wall

##### **Money Maze**

Avoid ghosts and collect coins in an all-action arcade classic

##### **Lunar Lander**

The traditional computer game specially written for the Electron

#### **Volume 2 contains:**

##### **Atom Smash**

Machine code thrills as you help to save the world from destruction

##### **Bunny Blitz**

Go egg collecting, but keep away from the proliferating rabbits

##### **Castles of Sand**

Build castles - but beware the rising tide and hungry sandworms

##### **Reaction Timer**

Test your reactions with this traffic lights simulation

##### **Solitaire**

The Electron version of the age-old game of logic and patience

##### **Jump**

Jump for your life in this exciting arcade action game

##### **Break Free**

Test your wits and reflexes in this popular classic ball game

##### **Code Breaker**

Crack the code in a colourful if frustrating brainteaser

##### **Panchnute**

Save the plunging sky divers from a watery end

##### **Star Fighter**

Attack the bandit ships in this fast moving 3D punch-up

**ONLY  
£5.95  
each**

**TO ORDER, PLEASE USE THE FORM ON PAGE 61**



# YOU AND YOUR MICRO OF MANY COLOURS

## Part Two of the Electron graphics series by TREVOR ROBERTS



IF you followed last month's article you should have no problems understanding why the commands:

```
MODE 5
COLOUR 130
COLOUR 0
```

produce black letters on a yellow background.

The MODE command puts the Electron into Mode 5, a four colour mode which has a screen of 32 lines, each holding 20 characters.

The default condition on entering this mode is that the text consists of white characters on a black background.

However if we're not content with this we can always change the colour of both the text and the background using the keyword COLOUR. To change the foreground colour we use:

```
COLOUR logical colour
number
```

while to change the background we use:

```
COLOUR logical colour
number +128
```

The logical colour number is a label. As we've said, Mode 5 has four colours so if you're going to label them with numbers it seems logical to use the numbers 0 to 3 - you might think that 1 to 4 is more logical but computers start counting at 0, not 1.

For Mode 5 the default

logical colours are:

```
0 Black
1 Red
2 Yellow
3 White
```

It's these numbers that we've been using with our COLOUR command. Nice though it would be to use:

```
COLOUR red
```

to get red letters, the micro works in numbers not words, so you have to use:

```
COLOUR 1
```

to get your red letter day.

Now when you bought your Electron you were probably told that it had 16 colours. Yet Mode 5 only has four colours. Were you misled?

No, you weren't. You can have 16 colours ranging from black to blue, through cyan and on to flashing magenta-green and white-black.

But, and it's a big but, in Mode 5 you can only have four of them at any one time.

As we said last time you can look on the logical colour numbers as paint pots. In Mode 5 the pots themselves are numbered from 0 to 3.

The COLOUR command decides which paint pot is used for text and background. When we enter the mode four pots are already filled with black, yellow, red and white.

However, we're not stuck

with these shades. We can fill the paint pots with any of 16 colours but as we've only got four pots in Mode 5 we can only have four of the 16 colours at any one time.

Having said we can change the colours in the pots, let's see how we do it.

Suppose we wanted to fill pot 3 with blue paint, rather than the white we have in it as a default. It would be nice if we could do something like:

```
FILL pot 3 with blue
```

Alas it's not so easy. Remember that the micro uses numbers not words, so its instructions tend to be numbers as well. Instead of FILL we have VDU 19 and instead of pot 3 we have the logical

colour number. So our instruction becomes:

```
VDU 19, logical colour
number, blue
```

Now the logical colour number is just the number we've used in our COLOUR command, 3 so we get:

```
'VDU 19,3, blue
```

The trouble is that we've still got the word blue in the instruction and this has to be a number. In fact it has to be the actual colour number which is just a label for the colour of paint we want to put in the paint pot.

As there are 16 of these colours there are 16 numbers, one for each, and, as computers start at 0, they're numbered 0 to 15.

Figure 1 shows which shades the actual colour numbers refer to.

So since we want blue paint in paint pot number 3 we use:

```
VDU 19,3,4
```

as 4 stands for blue. However this still won't work as, for reasons best known to themselves, Acorn insists that the command has three 0s tagged on the end. So to change logical colour 3 to blue we use:

```
VDU 19,3,4,0,0,0
```

It's an amazing command. Not only does it ensure that from now on anything displayed using logical colour 3 is blue, it also works backwards.

Anything still on the screen

Numbers	Actual colour
0	black
1	red
2	green
3	yellow
4	blue
5	magenta
6	cyan
7	white
8	flashing black-white
9	flashing red-cyan
10	flashing green-magenta
11	flashing yellow-blue
12	flashing blue-yellow
13	flashing magenta-green
14	flashing cyan-red
15	flashing white-black

Figure 1: Actual colour numbers

# Graphics

## From Page 51

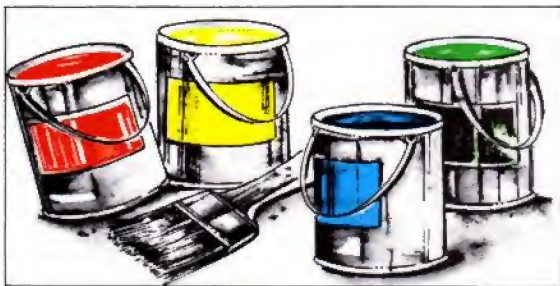
that was previously using logical colour 3 suddenly turns blue as well. VDU 19 appears to work backwards.

To put it formally, the structure of the VDU 19 command is:

VDU 19,logical colour  
number,actual colour  
number,0,0,0

I think of it as:

VDU 19, pot number, paint  
number,0,0,0



which I find easier to understand.

Notice that when we turned logical colour 3 blue the other three logical colours (0-2) are unaffected. COLOUR 1 still gives red text, COLOUR 2 yellow and, of course, the background is still black.

Try putting other colours of paint into logical colour 3. If you want it to be green a quick look at Figure 1 should convince you that:

VDU 19,3,2,0,0,0

will do the job.

Note that when you do this everything that was blue now magically turns to green. It's logical if you think about it.

Mode 5 only has four colours and the first three are unchanged. The fourth was blue and now we've turned it to green.

If nothing was done about it this would leave five colours (black, red, yellow, blue and now green) which is against the rules. Something's got to give, so all the blue turns to green.

Try assigning different actual colours to the four logical colours and see what happens. You can look on Figure 1 as a palette of the hues available. The following lines should start you off:

VDU 19,1,5,0,0,0  
VDU 19,2,9,0,0,0  
VDU 19,3,8,0,0,0

Don't worry if you get a little confused between the two colour numbers, logical and actual. A little practice and you'll soon get the hang of it.

If you want another way of looking at it you can think of the logical colours as being

pens and the actual colours referring to the inks that fill the pens.

In Mode 5 we've got four pens but 16 inks to choose from and, of course, a pen can hold only one ink at a time.

The COLOUR command chooses which pen is used while the VDU 19 decides which ink will fill that pen.

In this scheme of things the VDU 19 command can be viewed as:

VDU 19,pen number,ink  
number,0,0,0

So far we've stuck to Mode 5 for each experiment. Why not change to Mode 1, another four colour mode, with:

MODE 1

and play around with COLOUR and VDU 19. You'll see that

the default colours are just the same as Mode 5.

Modes 0, 3, 4 and 6 are two colour modes. In effect these are restricted to two pots of paint, though there is still the choice of one of 16 colours for each pot (or 16 inks for each of the two pens).

In these modes the default colours are black and white, so the logical colour numbers and defaults are:

0 Black  
1 White

The Electron's final mode is the 16 colour Mode 2. Here you can have up to 16 colours on the screen at any one time with the logical colour numbers going from 0 to 15.

Unsurprisingly, when you enter Mode 2 these logical colour numbers correspond to

the actual colour numbers of Figure 1.

However, if you wished you could use VDU 19 to fill all the pens with blue ink.

You've got 16 pens and you can fill them with the colours you want. In other words, you're not stuck with the default.

Figure 11 shows the logical colour numbers available in each of the seven modes, along with the default actual colours assigned to them.

Use it to explore the effects of the COLOUR and VDU 19 commands in the different modes.

This should keep you busy until next month, when we'll be taking a closer look at the Electron's modes and also using the commands we've learnt in some colourful programs.

MODES 0, 3, 4, 6			MODE 2 (and actual colours)		
Logical number		Colour (on entering mode)	Logical number		Colour (on entering mode)
Fore-ground	Back-ground		Fore-ground	Back-ground	
0	128	Black	0	128	Black
1	129	White	1	129	Red
			2	130	Green
			3	131	Yellow
			4	132	Blue
			5	133	Magenta
			6	134	Cyan
			7	135	White
			8	136	Flashing black-white
			9	137	Flashing red-cyan
			10	138	Flashing green-magenta
			11	139	Flashing yellow-blue
			12	140	Flashing blue-yellow
			13	141	Flashing magenta-green
			14	142	Flashing cyan-red
			15	143	Flashing white-black

**N.B.** The foreground logical colour numbers on entering Mode 2 are also the actual numbers.

Figure 11: Logical colour numbers and their defaults



# Micro Messages

## Power supply jack can be a problem

A WORD of warning to Electron users who are in the habit of resetting their machines by unplugging the power supply jack plug on the right side of the case.

The jack socket is soldered directly to the voltage regulator PCB and the repeated insertion and removal of the plug strains the soldered connections and eventually tiny cracks in the solder cause momentary interruptions to the power supply and the machine consequently resets losing the entire contents of memory.

I suffered several such unexplained resets before tracing the problem, which was easily remedied by opening up the computer, removing the PSU board and resoldering the three contacts. — **Andrew Rance, London SW.**

● Many thanks Andrew for your most useful advice which should be noted by all our readers.

To add to this, the Electron should be turned on and off at the mains socket to avoid wearing out the solder connections on the voltage regulator.

## Value of the Plus 3

I HAVE considered buying an Electron Plus 3 for some time. What has stopped me doing so is that other makes seem to be so much more versatile than the Plus 3.

Will I be able to run long commercial software which I hope to transfer from tape to disc even though the Plus 3 uses nearly 4k of RAM?

I have also been wondering if it is possible to join two Electrons together to give double the memory.

If I fitted the Mode 7 adapter and the Turbo Driver which doubles the Electron's speed would I then be able to run all BBC software? It sounds possible, but seems a little too easy. — **M.P. Hanley, Plymouth.**

● It's not true to say that

other disc drives plus interfaces are better than the Plus 3. They all have their advantages.

For instance, the Plus 3 allows an unlimited number of files on the disc, but the Cumana does not.

The Cumana however does not use up any RAM and the Plus 3 uses nearly 4k.

You've got to look carefully at each system and see whether it does what you want it to do.

The Plus 3 can be disabled, allowing long programs to be run from tape.

T2P3 from Slogger transfers software to Plus 3 disc.

You can't join two Electrons together, but Advanced Computer Products are going to produce an interface to allow a second processor to be plugged in.

This gives more memory and a good speed increase. Second processors are very expensive though.

Software which does not run on an ordinary Electron will not run after fitting a Mode 7 adapter and Turbo Driver.

Software that does run will be much faster and more colourful.

## Games for Electron

IN the November issue of Electron User I read a letter from P.A. Phillips who asked Acornsoft whether Revs was going to come out for the Electron.

I thought that you could get all the Acornsoft games on the BBC for the Electron.

Why can't more software houses publish games for the Electron? All the games in Boots are for the Spectrum, 64, Amstrad, BBC and even

the MSX.

Come on software houses, start publishing games for neglected machines. — **Stuart Hannah, Smallfield, Surrey.**

● Unfortunately, very few of Acornsoft's BBC games work on the Electron. You will find that Electron versions of the ones that do work exist anyway.

Even so, other software houses are producing excellent games well worth buying.

## Point of View

KNOWING how long it takes for a letter to appear in a magazine, Basil Crowhurst (Micro Messages, December) has by now probably sorted out his problems with the printer driver program for View, but my own experience may be of interest.

I too have a JP101 spark jet printer and I initially had great difficulty in exploiting its full capabilities.

Having discovered the very limited printing facility offered by the resident printer driver in View, I returned to the shop where I bought the printer.

They approached Acornsoft on my behalf but were told that the Acornsoft printer driver package would still not allow all the print variations available on the JP101.

Eventually I solved the problem by producing my own driver which enables me to use all the many and varied print styles of which the Olivetti JP101 is capable.

I have also devised a very simple screen dump for Mode 0 graphics (see listing) which, because it is entirely written in Basic, takes four and a half minutes to dump the screen to the JP101.

There is a better way, and I

plan to write a more flexible and efficient dump routine in machine code — when I learn how. — **Andy Dear, Clackmannanshire.**

```
10000 REM Mode0 screen dump
10010 REM For JP101 printer
10020 REM By Andy Dear
10030 VDU2
10040 VDU 1,27,1,71,1,49
10050 VDU 1,48,1,48,1,59
10060 VDU 1,56,1,48,1,59
10070 VDU 1,51,1,58,1,59
10080 VDU 1,52,1,27,1,98
10090 FOR UZ=12288 TO 32128
STEP 640
10100 FOR WZ=UZ TO UZ+7
10110 FOR PZ=WZ TO WZ+632 9
TEP 8
10120 VDU 1,,?PZ
10130 NEXT PZ
10140 NEXT WZ
10150 NEXT UZ
10160 END
```

## Transfer to disc

HAVING recently taken advantage of your outstanding bargains, I bought a Plus 1 and 3.

I got the Plus 3 because of its advantages over tape recorders, so when I saw your tape-disc program it was a godsend.

However on most of my commercial games the computer throws out the following message — LOCKED AT LINE 80.

Can you tell me how to overcome this flaw in your tape-disc program? — **S. Williams, Leicester.**

● There isn't a flaw in the program. As stated in the



## From Page 53

article, it will not copy commercial software.

We would get into all sorts of trouble if we published a program that could be used to pirate software.

Slogger's T2P3 will transfer most of your software to Plus 3 disc.

You won't be able to run the software without T2P3 which prevents piracy while still allowing you to have a copy on disc.

## Spoilt for choice

I AM considering getting a disc drive for my Electron.

With so many on the market, it is difficult to find a suitable one with Integral PSU to use with the Solidisc GFS and Plus 1 interface.

Can you recommend one or two 40 track models priced around £100? — Andrew Heavens, Clacton on Sea, Essex.

● There's not much to choose between different makes of disc drives.

We use a peculiar combination of Cumana drives in the office — dual 80 track 3 $\frac{1}{2}$ in and 3 $\frac{1}{2}$ in plus 5 $\frac{1}{4}$ in 40 track drives in tandem.

All work perfectly and are reasonably priced as well.

## Lawful transfer

HOW can I transfer my cassette programs, mainly Acornsoft and Superior Software, on to disc without contravening the copyright laws?

Cumana Disc Interface and 5 $\frac{1}{4}$ in 80 track drive. I have no wish to break any of the copying codes of practice, but I also do not want to continue wasting time running programs from cassette.

Are there any good utility ROMs or other software available which will help me get these programs on to disc?

I understand that some transfer ROMs only allow

**WHAT would you like to see in future issues of Electron User?**

**What tips have you picked up that could help other readers?**

**Here is your opportunity to share your experiences.**

**Remember that these are the pages that you write yourselves. So**

**tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE.**

**The address is:**

**Micro Messages  
Electron User  
Europa House  
68 Chester Road  
Hazel Grove  
Stockport SK7 5NY.**

those copied programs to run on the machine used to transfer them, but this is OK as I only want to use them for myself.

Unfortunately I am not a computer wizard capable of writing vast complicated programs to do this sort of thing.

What I want is to be able to use a computer as a useful tool without too much trouble. — Alistair Rose, Penkridge, Staffordshire.

● Slogger's T2CU ROM will transfer most of your software to Cumana disc.

The Cumana disc interface has a socket free for a ROM such as this.

## Formatting both sides

I BOUGHT my Electron 18 months ago and have recently expanded it by adding the Plus 1 and Plus 3, which has made the advice and information provided by Electron User indispensable.

Could you tell me how to format both sides of my double sided discs because, although the manual supplied with the Plus 3 describes how to format discs, I have only been able to format one side.

Since buying my Plus 3 I have found that the software available on microfloppies is very limited. I would therefore like to run BBC disc-based software on my Electron.

Is this possible? If so and what additional equipment would be required? — Miss J. Russell, Queens Park, London.

● Unfortunately you won't be able to format both sides of your discs because your Plus 3

disc drive only has one read/write head.

This means that you can only use one surface of your disc to store data even though your discs are double sided.

The only way you'll be able to use both sides is to add a second 3 $\frac{1}{2}$ in double sided drive to your Plus 3. This will be very expensive.

At present the only way

you'll be able to run a handful of BBC discs is to attach a 5 $\frac{1}{4}$ in disc drive to the Plus 3 and use ACP's 1770 DFS (see the February 1985 issue of Electron User).

With this set-up you'll be able to use a few selected BBC software packages.

You won't be able to use all BBC programs for several reasons, including protection, lack of Mode 7 and illegal programming.

As I'm sure you are aware, this configuration will also be costly.

## Shaded dumps

WHAT is the price of the Epson LX80 printer reviewed in the February 1986 issue of

## Shapely asteroids

I HAVE written a routine to draw asteroids.

Although it looks rather complicated to the non-mathematical it can be easily

altered to produce many different shapes. — J. Flynn.

● It's a pleasure to see such an interesting program that's well worth the effort of typing in.

```

100 REM ASTEROID VARIATIO
NS
110 REM BY J.Flynn
120 REM
130 MODE 1:GCOL 15,2
140 an=0:ad=P1/25
150 PROCfirst(600,500,200
)
160 PROCsecond(600,500,20
0)
170 PROCthird(300,500,100
)
180 PROCthird(900,500,100
)
190 PROCfourth(600,800,10
0)
200 END
210 DEF PROCfirst(X,Y,R)
220 MOVE X,R,Y
230 FOR K=0 TO 2*PI STEP
ad
240 an=an+ad
250 DRAW X+R*(COS(3*an)+3
*COS(an))/4,Y+R*(3*SIN(an)-
SIN(3*an))/4
260 MOVE X,Y
270 NEXT:ENDPROC
280 DEF PROCsecond(X,Y,R)
290 MOVE X,R,Y
300 FOR K=0 TO PI STEP ad
310 an=an+ad
320 DRAW X+R*(COS(3*an)+3
*COS(an))/4,Y+R*(3*SIN(an)+
SIN(3*an))/4
330 NEXT:ENDPROC
340 DEF PROCthird(X,Y,R)
350 an=0:MOVE X,R,Y
360 FOR K=0 TO 2*PI STEP
ad
370 an=an+ad
380 DRAW X+R*(COS(3*an)+3
*COS(an))/4,Y+R*(3*(SIN(an)-
SIN(3*an)))/4
390 NEXT:ENDPROC
400 DEF PROCfourth(X,Y,R)
410 MOVE X,Y*(R/4)
420 FOR K=0 TO 2*PI STEP
ad
430 an=an+ad
440 DRAW X+R*(SIN(2*an)+2
*SIN(an))/4,Y+R*(2*COS(an)-
COS(2*an))/4
450 NEXT:ENDPROC

```

#### Electron User?

As I have recently acquired a Plus 1 I am seriously thinking of buying a low cost printer, and was impressed by this particular one.

I have another question concerning the leads. Will the LX80 need any adaptation or will it fit directly into the Centonic printer interface on the Plus 1.

Please could you send me a screen dump program for the printer as it would help a great deal. — G. Sheldon, Barry, South Glamorgan.

● The Epson LX80 costs around £220. You'll find a simple screen dump in the March 1985 issue of *Electron User*.

There's a superb dump coming up soon which prints each colour a different shade of grey — watch out for it!

## New lease of life

SINCE discovering your magazine my Electron has had a rejuvenation.

I originally took Acorn User but was dissatisfied with the quantity and quality of space devoted to the Electron.

I have recently bought the Plus 1 Electron Workstation package and have now managed to find my way around View, which I am generally pleased with.

However it does seem to have some strange features.

When inserting or deleting text, or when scrolling using the Return or cursor keys, action carries on long after the particular key has been released. Is this a common feature?

My serious problem occurs when I print out hard copy.

I am using an Epson FX-80 and cannot get text printed at the top of the page.

When I give the PRINT command, printing starts nearly a third down the page.

Also when the command SCREEN is given the text appears about half way down the TV screen.

I have tried using the relevant stored commands such as Page Break and Page

Length but without effect.

The Page Length command has no effect for at least two pages, and headers and footers do not print or screen on these pages although they do appear further on.

Is the View cartridge faulty? — Neil Windsor, Pencoed, Mid-Glamorgan.

● View on the Electron is very slow at times. Consequently if you hold a key down the keyboard buffer fills up with the character and View carries on long after you've taken your finger off the key.

The reasons is that it only looks at the buffer and not the key itself.

You can slow down the auto repeat action of the keyboard with:

FX12,28

This should cure the problem. There's nothing wrong with your version of View.

To print at the top of the page you'll need to set the top margin and header margin to zero.

Start the letter or document by pressing Caps Lk/Func 0 and enter TM 0. On the next line enter HM 0.

This should do the trick.

## Manic Mole screen 9

HERE is a tip to help Helen Williams who complained in the November 1985 issue about missing out screen 9 on Manic Mole in the July 1985 issue of *Electron User*.

There is no need to miss it out and you can make it easier by changing the VDU statement in line 1070 to read:

```
1070 IF row=9 VDU  
19,0,0,0,0
```

This will display the maze in screen 9.

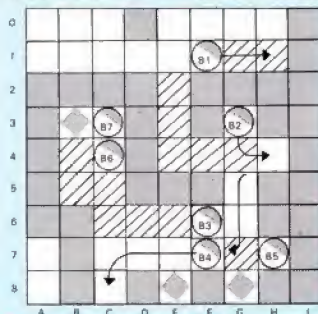
When you are sure you can remember the maze change the VDU back to its original form. — David M. Goffin, Hull.

● I'm sure Helen will be grateful for this tip. It's nice to see our readers responding regularly with useful hints.

# Repton guide

CONCERNING *Micro Messages* January 1986 and Neil Barick's PS on completing Screen J on Repton, the following information should help him. All instructions refer to the diagram below:

1. Remove soil from G1 and H1.
2. Push boulder B1 to H1.
3. Go under boulder B2 —





# Never before

... has there been  
such a helpful,  
easy-to-understand  
guide to BBC Basic

There has been an enthusiastic welcome from users of the Electron to "Getting Started on BBC Basic". And with good reason. For its author, Mike Bibby, is acknowledged to be one of Britain's leading experts on BBC Basic, and in it he achieves new standards in simplifying the teaching of Basic programming.

The book takes the reader step by step through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality - good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming, and will quickly acquire the ability to use structured techniques in creating his own programs.



*The chapters include:*

- ★ Basic Ideas - printing strings and numeric expressions
- ★ RUNNING your first programs
- ★ Strings and simple editing
- ★ Getting data from your keyboard with INPUT
- ★ REPEAT...UNTIL, the building blocks of loops
- ★ Controlling loops with FOR...NEXT statements
- ★ Modes and colour
- ★ Introducing procedures - a taste of structured programming
- ★ How to use subscripted variables
- ★ Nested loops
- ★ Into the second dimension with arrays
- ★ String manipulation
- ★ Simple data structures

**TO ORDER, PLEASE USE THE FORM ON PAGE 61**



If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

**Finalist for the Home Software  
of the Year Award**



**Contains 32 page booklet giving clear,  
easy-to-follow instructions on all 4 programs**

**Word Processor:** Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode – perfect for young children and people with poor vision.

**Database:** You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

**Spreadsheet:** Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program...

**Graphics:** Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

☆ Word Processor ☆ Spreadsheet  
☆ Database ☆ Graphics

**Now they're  
all together -  
in ONE simple  
package**

Four full-scale  
programs for  
an incredible  
low, low price!

**£5.95**  
cassette

Also available from:  
**BOOTS COMET Currys Dixons WHSMITH**  
**Greens Amstrad HILLIARD Spectra** and other computer stores

**Use the special order form on Page 61 – No stamp needed!**

# Listing rate

ONLY  
75¢  
each

Save yourself the chore of typing in listings by sending for our monthly tapes, packed with games, utilities, graphics and other programs from the pages of *Electron User*.

your movie code **NOTEBOOK**

**On the September 1984 tape:**  
**HAUNTED HOUSE** Arcade action in the spirit world. **SPLASH** A logic game for non-swimmers. **SOFT SHOWS** How sorting algorithms work. **SOFT TIME** The time they take. **CLASSROOM INVADERS** Multicolored characters go to school. **SAILOR** Nautical antics. **MATHS TEST** Try out your mental powers.

**On the August 1984 tape:**  
**SANDCASTLE** The Electron leads out. **KNOCKOUT** Breaker's batter brick walls. **PARACHUTE** Keep the skydivers dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKE** Pedal to the winner. **ELECTRON SCROLLER** Sliced strings slide sideways.

**On the July 1984 tape:**  
**GOLF** Play on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large letters for the simple. **BANK ACCOUNT** Keep track of your money. **CHARITIST** 30 graphs. **FORMULAE** Aids, volumes and angles.

**On the June 1984 tape:**  
**MONEY MAZE** Avoid the ghosts to get the cash. **CODE BREAKER** A musing is needed to crack the code. **ALIEN** See little green men - the Electron way! **Colour** commands without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT** Out an intergalactic shooting gallery. **SMILER** Have a nice day!

**On the May 1984 tape:**  
**RALLY DRIVER** High speed car control. **SPACE PODS** More aliens to annihilate. **CODE** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** New thoughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save Electron masterpieces.

**On the April 1984 tape:**  
**SPACEHIKE** A hopping arcade classic. **FRIEZE** Electron wallpaper. **PELICAN** Cross made safe. **CHESTIMMER** Clock your moves. **FLICKER** Automatic rhymer. **LIMERICK** Automatic rhymer. **ROMAN NUMBERS** In the ancient way. **BUNNYBILT** Easter program. **DOGDUCK** The classic logic game.

**On the March 1984 tape:**  
**CHICKEN** Test your nerve. **COFFEE** A titillating word game. **PARKY'S PERIL** Parks a invisible maze. **REACTION** Test how fast are you? **BRAINEASER** A puzzling program. **COUNTER** Mental arithmetic. **PAPER SCISSORS**. **STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create alien characters.

**On the February 1984 tape:**  
**NUMBER BALANCE** Mental arithmetic. **CALCULATOR** Makes your Electron a calculator. **PICTURES** Patterns game. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skills. **POSITRON INVADERS** The old arcade favourite.

**On the introductory tape:**  
**ANAGRAM** Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROMAP** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** New upper case letters. **ROCK, PAPER, SCISSORS** Three fireworks programs. **BOMBER** Drop the bombs before they crash. **DUCK** Screen animation. **CREATIONS** Collisions in space.

**On the April 1984 tape:**  
**INVASION FORCE** Exciting zip em space game. **EASTER EGG HUNT** Seasonal games using computer points. **BACK TO BASICS** Music tutor. **NOTICE BOARD** Text scrolling utility. **SEARCH AND RECOVER** Two routines from the disc arena. **NOTEBOOK** Recursion backwards.

**On the March 1984 tape:**  
**GRAND PRIX** Exciting race game. **DIGER** A clever test of strategy. **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of turning. **TRICIRC** A circle of triangles.

**On the February 1984 tape:**  
**NECROMANCER** Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Backup utility. **MACHINE CODE** How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

**On the January 1984 tape:**  
**FRUIT FORM** An eratic magic. **HELICOPTER RESCUE** Pilot an air sea rescue helicopter. **MACHINE CODE** Tested columns between sprites. **TAPEDISC** Transfer your software to disc. **MODE012** Multi-Mode screens.

**On the December 1984 tape:**  
**GET SET SANTA** Christmas fun collecting presents. **MISSILE ATTACK** Save your chief. **PROGRAM PRIMER** Using Jyotika. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and cards for all. **DISC MENU** Disc Menu creator.

**On the November 1984 tape:**  
**KARATE WARRIOR** Electrifying combat. **USA Mode 71**. **PAINT ROLLER** Colourful arcade action. **DEFUSE** Defuse the bombs. **SPRITE PRINT** Machine code graphics utility. **TRAIN FAN** from stationary graphics.

**On the October 1984 tape:**  
**DUNGEON QUEST** An amazing all action arcade adventure. **PILOT** Computer assisted learning language. **RAYING ROLLER** Arcade action in the garden. **TRAIN ANIMATED** game. **KALEIDOSCOPE** Colourful graphics action.

**On the September 1984 tape:**  
**TEKNDAN** 3D Wild West shootout. **PINCURSOR** Machine code graphics. **SPRITE/ED** Sprite editor. **COMPOSE** Writing music simplified. **REVERSI** Cunning strategy game. **SIMPLEFILE** Save and read data. **BOUNCE BALL** Two player action. **ROTATE** Animation in a spin.

**On the August 1984 tape:**  
**DIGGA** Exciting game played beneath the earth. **DODGE THE ASTEROIDS** Fun deep in space among the asteroids. **MCODE** **GRAPHICS** Sliding pixels of beer! **FX** The OS explored. **MOVEIT** An intriguing sliding puzzle. **HEXAGRAM** An educational game to increase your word power.

**On the July 1984 tape:**  
**MANIC MOLE** Machine code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully collect TNT. **MCODE GRAPHICS** Two demonstrations. **FX1/2** The OS on call. **PIRATE MATHS** Fun fun. **NOTEBOOK** Password Generator.

**On the June 1984 tape:**  
**QUASIMODO** Belting classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun.

**REFLECT** Aggressive aliens. **ENGINE** Animation. **DODGE** Race track action. **STINGALONG** Boring fun. **CASTLE** Medieval graphics. **THE CURVE** Angles and art. **NOTEBOOK** Trees.

**On the May 1984 tape:**  
**SKRAMBLE!** Compulsive arcade action. **SHEEPIN!** The logic game. **TEXTWRITER** Screen utility. **LIFE** A cultured classic. **CEORIC** Educational fun. **THREE-D** Outstanding utility. **SPOKES** Fascinating graphics. **MOONORBIT** Heavenly display. **BLAZON** Heraldic devices. **FLOWERS** A Basic bouquet. **NOTEBOOK** Annotated animation.

**On the April 1984 tape:**  
**SUPY ARCHER** Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switched joystick routine. **OXO ONE OUT** Educational fun. **POLYGONS** 3D action. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien encounters. **HILLO** Gussing game. **NOTEBOOK** Help to assembler.

**On the March 1984 tape:**  
**FRIEZE** Ice cube arcade action. **SCREENDUMP** Two procedures for printer dumps. **KILLER** The machine code file routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Best the burning fun. **ANIMATION** Two example programs. **PISG** Firing bases. **NOTEBOOK** Digs formatting.

**On the February 1984 tape:**  
**CRAAL** The mystifying maze adventure. **BOUNDY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE A** Strategy/headical conversation. **CATCHER** Collect the eggs before they break. **Clock** Time-keeping program. **BACER** Grand Prix action. **NOTEBOOK** Graphics windows. **TRIG** All the right angles.

**On the January 1984 tape:**  
**SPACE BATTLE** Destroy the deadly descending aliens! **NEW YEAR** A sound and graphics greeting. **SCORPE FROM CARDVO** Mineshaft action. **PIE CHART** Statistics made simple. **CLAYPIGION** An Electron birdshot. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilian arcade action. **CHEESE RACE** Best wall mind.

**On the December 1984 tape:**  
**CHINTMAS BOX** Align the presents logically. **SILLY SANTA** Sort out the middle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message saved. **CARDL** Interrupt driven music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Simple string handling.

**On the November 1984 tape:**  
**STAR FIGHTER** Sort-plot missions. **SCROLLER** Wrap around machine code. **URBAN SPRAWL** Environmental action game. **SPELL** Alphabetic education. **JUMPER** Level headed action. **CAESAR** Code break to broken. **KEYBOARD** Typing game.

**On the October 1984 tape:**  
**BREAKFREE** Classic arcade action. **ALPHASWAP** A logic game to strain your brain. **SOUND GENERATOR** Tune the Electron's sound charms. **MULTICHARACTER** **GENERATOR** Compels characters. **SHOTS** simple. **RIGID** 8 Out of this world graphics. **NAVYDAY** Help with





Learning can  
be fun

**FUN  
SCHOOL!**

**10**  
programs  
on each  
cassette  
or disc

Help with  
reading:

From simple shapes  
and letters to  
spelling and  
anagrams

3 cassettes  
for 3 age groups

- Under-5's
- Ages 5-8
- Ages 8-12

Only

**£4.95**  
CASSETTE

Help with  
maths:

From number  
recognition and  
simple addition  
to simple  
of logic

Early  
learning -  
the easy way  
on the BBC  
Micro and  
Electron

All  
programs  
classroom  
tested and  
educationally  
approved

Use the special order form  
on Page 61. No stamp needed.

## Educational Computing on the Electron

**9 FULL LENGTH programs**  
designed to stimulate, educate  
and entertain – both  
school and at home

The Micro User Education Special  
Volume 1 has now sold out But  
Volume 2 is still available

It contains nine full length  
programs written to the highest  
standards and each picked to  
combine educational worth with  
sheer enjoyment. The nine  
programs cover topics from early  
reading and simple sums to the  
rules of punctuation and angle  
estimation – and there's an  
excellent introductory database.

The magazine contains the  
complete listings of all the  
programs together with advice on  
how they can be adapted to cater  
for individual needs.

**FunFactors:** Arcade style factor  
learning. **Windmill:** Word, number  
and colour recognition. **Angler:**  
Angle estimation fun. **Spelldroid:**  
Learn to spell with our friendly  
robot. **Tortol:** Teach and test the  
rules of simple addition.  
**Discovery:** A strategy based  
phrase identification game.  
**Punctuation:** Test and teach the  
rules of punctuation. **Junior  
Database:** A comprehensive  
database for the young learner.  
**Chinese Takeaway:** Teach and  
test the rules of simple  
subtraction.



Education Special Volume 2	
Magazine	£1.50
Cassette	£4.95
Cassette and Magazine	£6.00

Order on Page 61



Bring all the excitement  
of professional snooker  
into your home!



If you already have a subscription which does not expire for several months you can re-order early to benefit from this exceptional offer.

**You can save £5**  
**with this exclusive**  
**subscription offer**

Steve Davis Snooker is the ultimate computer version of the game that has millions of viewers glued to the TV sets.

Its many features include:

- Reset previous shot facility.
- Accurately definable spin.
- Infinitely variable speeds.
- Highest break table.
- True to life ball movement.

If you take out a subscription for *Electron User* using the order form opposite you can obtain Steve Davis Snooker at an unbeatable price:

**£3.95 cassette** (RRP £8.95)

(Not available without subscription)

# Don't miss these bargains!



**Your Electron  
needs  
protecting!**

Protect your Electron with our luxury dust cover made of soft pliable water-resistant vinyl, bound with strong cotton and decorated with the Electron User logo.

**Keep your  
copies neat  
and clean!**

This handsome binder is bound in attractive red pvc with the Electron User logo in gold blocking on the spine. It will hold 12 magazines firmly secured in place by metal rods.



All prices include postage, packing and VAT

Overseas orders sent exclusively by Air Mail

£ p

Valid to April 30

Please enter number required in box

£ p

**Electron  
User  
tapes**

26 introductory programs	3032	
Lunar Lander	1984 3033	
Chicken	1984 3034	
Spacehike	April 1984 3035	
Rally Driver	May 1984 3036	
Money Maze	June 1984 3037	
Golf	July 1984 3038	
Castles of Sand	Aug 1984 3039	
Haunted House	Sept 1984 3040	
Breakfree	Oct 1984 3041	
Star Fighter	Nov 1984 3042	
Christmas Box	Dec 1984 3043	
Space Battle	Jan 1985 3044	
The Kingdom of Cast	Feb 1985 3045	
Mr Freere	Mar 1985 3046	
Super Archer	April 1985 3047	
Skramble	May 1985 3048	
Quasimodo	June 1985 3049	
Manic Mole	July 1985 3050	
Digga	Aug 1985 3051	
Tex'n Dan	Sept 1985 3052	
Dungeon Quest	Oct 1985 3053	
Karate Warrior	Nov 1985 3054	
Get Set Santa	Dec 1985 3055	
Fruit Worm	Jan 1986 3056	
Grinji	Feb 1986 3057	
Grand Prix	Mar 1986 3058	
Invasion Force	April 1986 3301	

**Electron User back issues**

£1.50 UK	February 1984 3007	N/A
£2.50 Europe	March 1984 3008	
£3.50 Overseas	April 1984 3009	N/A
	May 1984 3010	
	June 1984 3011	
	July 1984 3012	
	August 1984 3013	
	September 1984 3014	
	October 1984 3015	
	November 1984 3016	
	December 1984 3017	
	January 1985 3018	
	February 1985 3019	
	March 1985 3020	
	April 1985 3021	
	May 1985 3022	
	June 1985 3023	
	July 1985 3024	
	August 1985 3025	
	September 1985 3026	
	October 1985 3027	
	November 1985 3028	
	December 1985 3029	
	January 1986 3030	
	February 1986 3031	
	March 1986 3200	N/A

**Electron Plus 1**

£39.95 UK 3084

**Electron Workstation  
Package**

£69.95 UK 3085

**Electron Language**

Lab £89.95 UK 3087

**Electron Data Manager  
Package**

£149.95 UK 3086

UK only

Send to: **Electron User**  
**FREEPOST,**  
**Europa House,**  
**68 Chester Road,**  
**Hazel Grove,**  
**Stockport SK7 5NY.**

Please allow 28 days for delivery

Order at any time of the day or night

Telephone Orders:  
061-429 7931Orders by Postel:  
Key '95, then 614568383

Don't forget to give your name, address and credit card number

ENQUIRIES ONLY: 061-480 0171 9am-5pm

**Electron  
User annual  
subscription**

UK & Eire (Sterling only) £12 3007  
Europe £20 3003  
Overseas £35 3004

**Steve Davis**

(Only available if  
subscription order  
is included)

£3.95\* 3094

Tick if company/inst

\*Add £1 for Europe

\*Add £2 for Overseas Commence with \_\_\_\_\_ issue

**Cassette tape**

£35 UK 3005

annual subscription £45 Europe/Overseas

Commence with \_\_\_\_\_

**Education Special**

Classroom Computing on the Electron

**Vol. 2**

Electron Cassette £4.95 3076

Micro User Education Special No. 2 £1.50 3320

Both the above £6.00 3077

Europe/Overseas - add £1

**Fun School tape**

Under-5s 3080

Ages 5-8 3081

Ages 8-12 3082

**Mini  
Office**

£5.95 UK 3062

£8.95 Overseas

**Ten of  
the Best**

Volume 1 3068

Volume 2 3069

**Classic Card and  
Board Games**

No. 1 Tape £5.95 3080

3 1/2" Disc £7.95 3082

No. 2 Tape £5.95 3091

3 1/2" Disc £7.95 3093

\*Add £1 for Europe

\*Add £2 for Overseas

**Getting  
Started in  
BBC Basic**

£5.95 UK 2289

£7.45 Europe

£8.45 Overseas

**Dust cover**

£3.95 UK 3058

£4.95 Europe/Overseas

**Binder**

£3.95 UK 3059

£6.95 Europe

£10.95 Overseas

&gt;&gt;&gt;

**TOTAL**

Payment: please indicate method (✓)

☐ Access/Mastercharge/Eurocard

Card No. \_\_\_\_\_

☐ Barclaycard/Visa

Card No. \_\_\_\_\_

☐ Cheque/PO made payable to Database Publications Ltd.Expiry date  
/

Name \_\_\_\_\_

Address \_\_\_\_\_

Post Code \_\_\_\_\_



# FREE RACING ANALYSER

# ELECTRON POOLS PREDICTOR

14,000  
MATCH  
DATABASE

After three successful seasons of pools prediction on the BBC micro, we are pleased to announce the Electron version of our renowned Pools Predictor program. Complete with powerful form analysis, a massive database and much more. And making this an outstanding punter's package, there is a free Racing Analyser Program to let you analyse any horse race using the racecard from your daily paper. Now beat that for value!

£8.99

MAYDAY  
SOFTWARE

181 Portland Crescent  
Stanmore, Middx. HA7 1LR

# ELECTRON EPROM PLUS SIDEWAYS ROM UNIT FOR THE ELECTRON II

Using this Superb ADD-ON for the Agem Electron with PLUS 1 expansion you can fit up to 4 ROMS/EPROMS (8 with 2 units fitted) which will then be available at the flick of a switch.

The EPROM PLUS plugs into either of the expansion sockets of the PLUS 1, and will accept BK or 16K ROMS/EPROMS. The facility to POWER-UP into whichever ROM is selected, or BASIC if required, is a useful feature of the unit.

An added bonus is that many of the ROMS available for the 'Beet' will also run on the Electron, offering another world of software.

ORDERING: One EPROM PLUS Unit £14.95

Two EPROM PLUS Units £27.95

Please add £1.00 P&P

## SPECIAL INTRODUCTION OFFER

Two EPROM PLUS Units ONLY £24.45 + P&P

## EXPANDOR SYSTEMS

99 Staley Hall Road, Staleybridge, Cheshire SK15 3DP.

Tel: 061-303 7646 Tel: 061-747 5688

# ADVERTISERS' INDEX

21st Software	47
A.C.P.	15
Aardvark	46
Andy	38
C&F Associates	35
Doctor Soft	8
Epic Software	9
Expander Systems	62
First Byte	4
Golem	25
Kosmos Software	62
Mayday Software	62
Micropower	42 & 43
Pace	6
Peak Soft	38
Potter Programs	25
Qualsoft	18
Robico Software	35
Slogger	36 & 37
Superior Software	2, 63, 64
Tiger Software	62
Voltmace	21

# FREE SOFTWARE!

YES - WE REALLY MEAN IT! TO HELP US REDUCE SOME STOCKS WE WILL GIVE YOU ONE FREE CASSETTE WITH EVERY THREE YOU BUY FROM US!

- Purchase 3 Games at our already DISCOUNTED price of only £3.25 each and have a fourth FREE! Just send £9.75 plus 70p carriage and we will send by return your 4 Games. Please note that because of this special offer, the 4 Games we will send you are our choice - BUT will be taken from the 21 listed below. HOWEVER, you may state any titles that you DO NOT require.

## - ALL ORIGINAL TITLES -

Stock Car	Gridlins	Search Head
Galactic Commander	Jet Power Jack	3D Bomb Alley
Felix In The Factory	Cybertron Mission	Moonrider
Danger UXB	Electron Invaders	Bubble Trouble
Five-A-Side Soccer	Battlezone 2000	Francy
Gunsnaka	The Valley	The Mine
Escape Moonbase Alpha	Felix & The Monsters	Chuckie Egg

# EPSON P40 PRINTER OFFER! ONLY £50.75 + £4 carriage

- 45 cps
- Enlarged and condensed print
- Emphasised print
- Normal and double density graphics
- 80 column in condensed mode
- Uses roll paper
- Supplied with paper roll
- Uses NiCad rechargeable batteries
- Complete with mains adaptor
- Parallel interface

## CUMANA DISK DRIVE PLUS DISK INTERFACE OFFER!

Cumana CS100 disk drive + double density disk interface + utility disk + manual only £154.95 + £4 carriage. (all fits the Plus 1)

TELEPHONE FOR OUR OTHER LOW HARDWARE PRICES - AND SPECIAL OFFERS!



## TIGER SOFTWARE

66 St. Michaels Lane,  
St. Michaels Trading Estate,  
Bridport, Dorset DT6 3RB. Tel: 0308 23655

# WANSWIRE SOFTWARE

## The ANSWER BACK QUIZ Series (BBC and Electron)

### ANSWER BACK - JUNIOR

(£9.95 cassette, £10.95 disc)

An enormous collection of general knowledge quizzes and a superb fairy-tale game for the 6-11 year olds.

### ANSWER BACK - SENIOR

(£9.95 Cassette, £10.95 disc)

A space game and a gigantic collection of general knowledge quizzes. Ages 12-Adult.

### ANSWER BACK - SPORT

(£9.95 Cassette, £10.95 disc)

Two sports games and a massive series of quizzes on all the popular sports. Ages 14-Adult.

### ANSWER BACK Program Features:

- \* Unlimited quiz creation, editing and saving facilities. (No knowledge of programming required).
- \* Multiple choice, True-False? and complete-the-answer modes.
- \* Immediate display of mistakes; performance summary and optional re-run of questions incorrectly answered.
- \* Correct answers gain further turns in the compelling games.

## The FACTFILE 500 Series (BBC and Electron)

Each pack contains a supplementary database of 500 questions and 2000 multiple choice answers for use with the above ANSWER BACK programs. The modules have been compiled by teachers, experts and specialists.

NATURAL HISTORY (Ages 10+)	£3.95 Cassette, £5.45 disc
ARITHMETIC (Ages 6-11)	£3.95 Cassette, £5.45 disc
SPELLING (Ages 8-12)	£3.95 Cassette, £5.45 disc
ENGLISH WORDS (Ages 12+)	£3.95 Cassette, £5.45 disc
KNOW ENGLAND (Ages 12+)	£3.95 Cassette, £5.45 disc
KNOW SCOTLAND (Ages 12+)	£3.95 Cassette, £5.45 disc
FIRST AID (Ages 12+)	£3.95 Cassette, £5.45 disc
GENERAL SCIENCE (Ages 14+)	£3.95 Cassette, £5.45 disc
SUPER SPORTS (Ages 14+)	£3.95 Cassette, £5.45 disc

All prices include VAT, P&P and 24-hour despatch.  
Send cheque, PO, ACCESS number or an official order.  
Detailed catalogue available on request.

## KOSMOS SOFTWARE LIMITED

FREEPOST, DUNSTABLE, BEDS LU5 6BR. Tel: 05255 3942



**MORE THAN JUST A SEQUEL. A NEW EXPERIENCE**

# REPTON 2



REPTON met with unanimous acclaim from games players and reviewers alike. Now, totally redesigned and rewritten, we bring you a new experience... REPTON 2 — a challenge even for hardened REPTON addicts! Not only must you collect all the diamonds (more than a thousand in total), you must also find the 42 jigsaw puzzle pieces which have been strewn throughout the 16 levels. The levels of play, each 16 times the size of the TV screen, are connected by a series of transporters which propel you backwards and forwards between the different scenarios — but each transporter can only be used once. Each level has its own characteristics: brave the meteor storms at the planetary surface; entice the haunting spirits into their cages by strategically positioning the boulders; avoid the eerie skulls of past explorers; unlock the sales with hidden keys; and crush the fearsome monsters which hatch from giant eggs. Can you complete REPTON 2?

## MORE PRIZES!

Complete REPTON 2 and enter our competition. The first 100 winning entrants will each receive a beautifully designed "I'VE COMPLETED REPTON 2" cotton T-shirt; all correct entries received before 31st March 1986 will be eligible for the cash prize of **£200**

**CASSETTE VERSION — £9.95**

**BBC DISC VERSION — £11.95**

**WE PAY UP TO 20% ROYALTIES FOR HIGH QUALITY BBC & ELECTRON PROGRAMS**



**SUPERIOR SOFTWARE LTD.**

Dept. MU12, Regent House,  
Skinner Lane, Leeds 7,  
Tel: 0532 459453.



## OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.





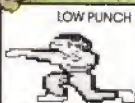
THE INTRODUCTORY RITUAL



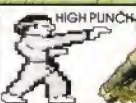
IN MID BATTLE



LOW KICK



LOW PUNCH



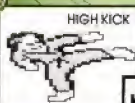
HIGH PUNCH



ARM BLOCK



SWEEP



HIGH KICK



FLYING KICK

ELECTRON

BBC  
MICRO

Set in the realm of the mystic Orient, Karate Combat pairs you, in thrillingly realistic battle, against 16 of the mightiest and most skilful exponents of "open-hand" fighting. Each opponent has different fighting characteristics and you must cunningly use different techniques to tackle each adversary. Your aim is to move up the rankings and eventually do battle against the 16th opponent, the ultimate challenge — The Master! In addition to the competition mode, the program includes a 2-player mode and a practice mode, complete with a punch-bag, to enable you to master your repertoire of punches, kicks, blocks, spins, sweeps and the spectacular flying kicks.

PRICE: £8.95 (cassette), £11.95 (BBC disc)

**COMPETITION COMPETITION COMPETITION COMPETITION**

**COMPETITION** — If you defeat The Master you can enter our competition with a chance of winning an impressive trophy (pictured on the right) and the cash prize of £100. Closing Date: 30th September, 1986.



**SUPERIOR  
SOFTWARE**

Limited

Dept. EU4, Regent House,  
Skinner Lane, Leeds 7.  
Tel: 0532 459453.



## OUR GUARANTEE

- All mail orders are despatched within 24 hours by first class post.
- Refunds and replacements free.
- Faulty cassettes and discs will be replaced immediately.

KEYBOARD

JOYSTICKS



**WE PAY TOP ROYALTIES FOR HIGH QUALITY SOFTWARE**